Service Manual

Leica OH4

Stand for neuro surgical microscopes

Doc. Code 10 665742 – 04/2007

Edition 1

Leica MICROSYSTEMS

Legal questions / Safety (10 665 629) 1

Service News, Modifications 2

OH4 Stand (10 665 744) 3

4

5

6

7

8

User Manual (10 714 367) 9

Installation Manual (10 714 368) 10

Rechtsfragen/Sicherheit, Legal questions/Safety

Inhaltsverzeichnis / Table of contents

Kapitel/Chapter	Seite/Page
Liste der Symbole und deren Bedeutung	1
List of symbols and their meaning	2
Rechtsfragen / Legal questions	3
Sicherheit / Safety	4

Leica Microsystems (Schweiz) AG, Heerbrugg 2001

Liste der Symbole und deren Bedeutung

GEFAHR

Unmittelbare Gebrauchsgefahr, die zwingend schwere Personenschäden oder den Tod zur Folge hat.

WARNUNG

Gebrauchsgefahr oder sachwidrige Verwendung, die schwere Personenschäden oder den Tod bewirken kann.

VORSICHT

Gebrauchsgefahr oder sachwidrige Verwendung, die nur geringe Personenschäden, aber wesentliche Sach-, Vermögens- oder Umweltschäden bewirken kann.

Information

Nutzungsinformation, die dem Benutzer hilft, das Produkt, die Unterlagen technisch richtig und effizient einzusetzen.

List of symbols and their meaning

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Hazardous situation caused by careless or incorrect use may result in fatal injury or even death.

CAUTION

Indicates an operating risk or improper operation. May cause minor personal injury but significant material, financial or environmental damage.

Information

Important paragraphs which must be adhered to in practice as they enable the product or Service Manualation to be used in a technically-correct and efficient manner.

Rechtsfragen / Legal questions

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Sicherheit / Safety

Für die Servicetechniker und Servicetechnikerinnen gelten folgende Pflichten:

- Sie verstehen und befolgen die Sicherheitsinformationen und die Instruktionen auf dem Produkt, in der Gebrauchsanweisung sowie im vorliegenden Service Manual.
- Sie kennen die neusten lokalen gesetzlichen Sicherheits-, Unfallverhütungs- und Arbeitssicherheitsvorschriften.
- Sie benachrichtigen Leica Microsystems (Schweiz) AG, Heerbrugg, schriftlich, sobald an der Ausrüstung Sicherheitsmängel auftreten.

Service technicians have the following obligations:

- To understand and follow the safety information and instructions on the product, in the user manual and in this Service Manual.
- To be familiar with the newest local regulations relating to safety, prevention of accidents and employment security.
- To inform Leica Microsystems (Schweiz) AG, Heerbrugg, immediately in writing if the equipment becomes unsafe.

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Service manual Leica OH4 stand

10 665 744 – Release 04/2007

Table of content

1. Technical Description
2. Wiring Diagram and Locations
3. Service Programs
4. Fault Finding
5. Replacing Modules
6. Maintenance Service
7. Inspection
8. Spare Parts Catalogue
9. Revisions and Modifications

Releases Leica OH4 Service manual

Releases:

04/2007 Edition 1

1. Description - Leica OH4

Table of content

Chapter	Page
General	1-1
Structure of construction	1-2
Overview system articles	1-3
Accessories	1-3
Technical data	1-4
Principal description	1-8
Control elements	1-10
Indication operating state	1-11

Description of the Leica OH4

General

Description

The Leica OH4 is a new neuro stand system, consisting of the new OH4 stand system and the existing M525 microscope system. This description will mainly concern the stand system.

Service- relevant product improvements

Date	With serial number	Concerning module	Description of product change	Remark

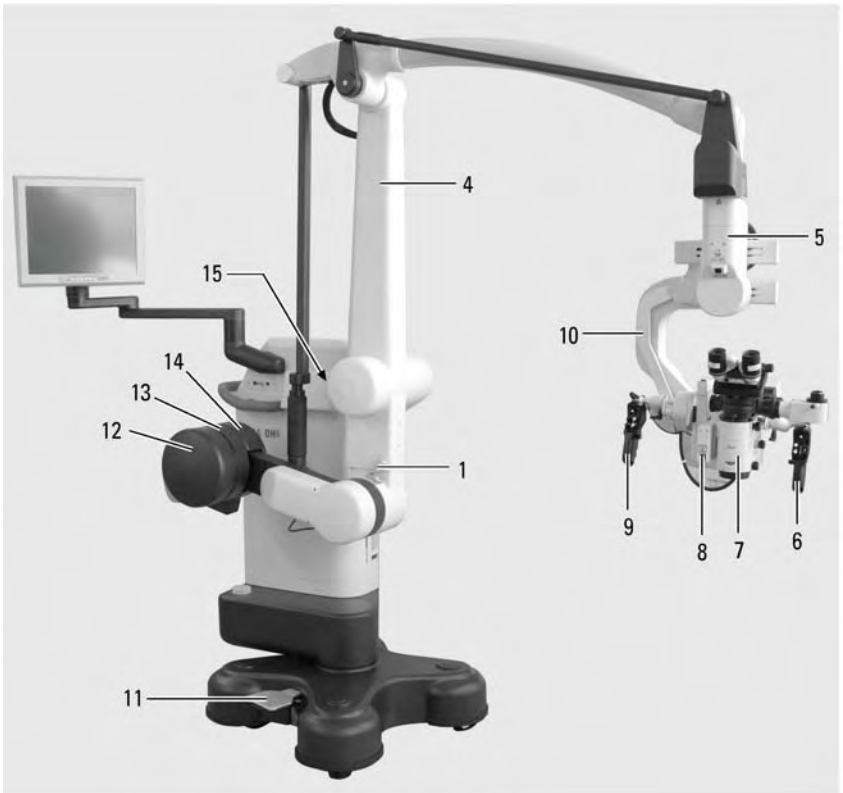
Structure of construction

Overview

1 Locking knobs

2 Access hatch

3 Cover for fuses



4 Vertical arm

5 Cover

6 Right handle

7 Optics carrier

8 A-slide

9 Left handle

10 Swing carrier

11 Foot brake

12 Cover for removable weights

13 Fixed weight (front)

14 Fixed weight (rear)

15 Stop for swing arm

Overview of system articles

The Leica OH4 system consists of the following system articles:

Description	Short name	Number	Stock n°
OH4 Stand System		**1**	**10 448 236**
including Xenon bulb		2	10 448 022
Optics carrier M525 OH4		**1**	**10 448 238**
Installation manual		1	10 714 368
User manual		1	10 714 367

Accessories

Various accessories, up to 13 kg, can be adapted onto the dovetail microscope interface. Weight discs can be added or removed to the D-balance unit and allow to align the balancing range to the customer's equipment. The recommendation in the assembly manual (2 heavy discs and 2 light discs mounted) covers the weight range of 7.3 kg up to 11,3 kg, which will fit to the most common configurations. If the customer's equipment is out of this range, discs need to be added or removed:

Serial number: OH4-20056 to 20196

Number of weight discs		**Load Optics carrier [kg]**	
Heavy	Light	Min.	Max.
2	1	7.5	11.0
2	2	8.3	12.0
2	3	9.0	13.0

Serial number: From OH4-20206

Number of weight discs		**Load Optics carrier [kg]**	
Heavy	Light	Min.	Max.
2	1	6.5	10.5
2*	**2**	**7.3**	**11.3**
2	3	8.0	12.0

* Standard configuration

Generally, accessories from the M525 serial do fit to the OH4 system. CAN handles and footswitches can be assigned individually for each user (see User manual Doc.Code 10 714367, configuration menu, page 48). A mouth switch can be connected as well. The current options as

- Leica DI C500 / IGS
- Leica ULT500
- Fluorescence: FL400 , FL800, FL400/800
- all MDRS4 Touchscreens in combination with the MDRS4

are possible to be integrated to the Leica OH4 system.

Technical data

Electrical data

Power connection for Leica M525 OH4:	1600 VA 50/60 Hz 100 V (+10 %/–15 %) 120 V (+10 %/–15 %) 220 V (+10 %/–15 %) 240 V (+10 %/–15 %)
Protection class:	Class 1

Microscope Leica M525

Magnification:	6:1 zoom, motorized
Working distance:	207mm – 470mm, variable through motorized multifocal lens, continuously adjustable; manually adjustable override
Focusing:	Motorized via multifocal lens; manually adjustable
Illumination:	Illumination system specially developed for microsurgical applications, continuously adjustable illumination field diameter with Gauss-shaped light distribution. Continuously adjustable brightness at constant color temperature.
AutoIris™:	Built-in automatic zoom-synchronized illumination field diameter, with manual override and reset feature.
Main light source:	High performance 300 Watt xenon arc-lamp through fibre optic.
Emergency lamp:	300 Watt xenon arc-lamp on separate electrical system
BrightCare™:	Safety technology for the working distance synchronized to light control

Optical data

Magnification range:	1.2x – 12.8x with 10x eyepiece
Field of view (dia. in mm)	16.5mm – 180mm with 10x eyepiece

Microscope carrier

Rotation range:	540°
Lateral tilt:	50° to left / 50° to right
Inclination tilt:	-30° / +120°

XY speed:	Zoom linked XY speed
Balancing:	A,B,C and D axes fully automatic, each can be corrected manually
Intraoperative balancing:	AC/BC button for automatic intraoperative balancing of A&C axes and for B&C axes
Brakes:	1 brake for A/B axis 1 brake for C axis
Indicator:	LED for Fluorescence mode status, LED for Video record status

Floor stand

Type:	Floor stand with six electromagnetic brakes
Base:	720mm x 720mm with four 360° rotatable casters with 130mm diameter each, one central single step foot brake
Balancing:	New "no brake release" Auto-Balance: One button / two push for complete automatic balancing of stand and optics
Intraoperative Balancing:	AC/BC button for automatic intraoperative balancing of the AC axis and for BC axis
Swingarm:	Patented advanced movement system for perfect balance in six axes, new vibration damping technology
Floorstand control unit:	New generation touch panel technology. The latest electronics control for the continuous governing of all motor functions and the light intensity. Data shown by means of LCD. Built-in BrightCare™ technology for the working distance synchronized light control. ISUS™ Intelligent Setup System, Menu selection based on unique software for user-specific configuration, with built-in electronic auto-diagnosis and user support.
Control unit stand:	Software independent hard keys for illumination and auto-balancing. Indicator for Main / backup illumination and Fluorescence modes, Open architecture for future software developments.
Light source:	Dual Xenon arc-lamp illumination system and built in automatic lamp quick changer
Controls:	10 functions pistol grips for zoom, focus, all-free release of six brakes, side button for user-defined brakes, motorized lateral tilt and inclination (XY) or Leica DI C500 functions. Expect for the all-free button all functions are freely programmable. Mouthswitch for releasing the user defined brakes 12 functions foot control and handswitch.
Integration of documentation:	Prepared for integration of Video-and digital recording systems. Open architecture
Connectors:	Numerous built-in connectors for Video, IGS and control data transfer, Internal Power 12 VDC, 19 VDC and AC connections
Carrier for monitor:	700mm long and flexible arm with 4 axis for rotation and inclination to carry optional video monitor

Surface coating System:	Coated with antimicrobial paint
Minimum height:	1945mm in park position
Range cantilever:	Max. 1925mm
Load:	Min. 6.5 kg and max. 12 kg of accessories to the microscope
Weight:	Approx. 320kg with full load

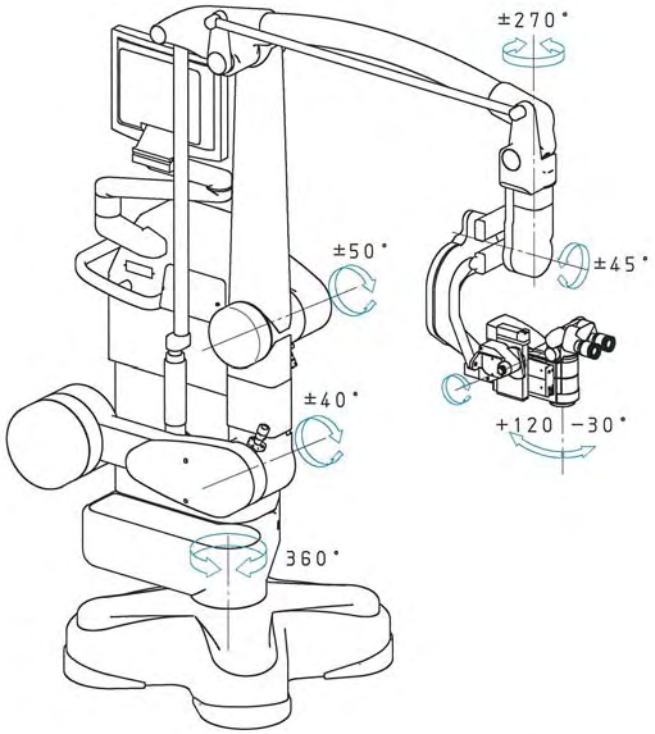
Standards

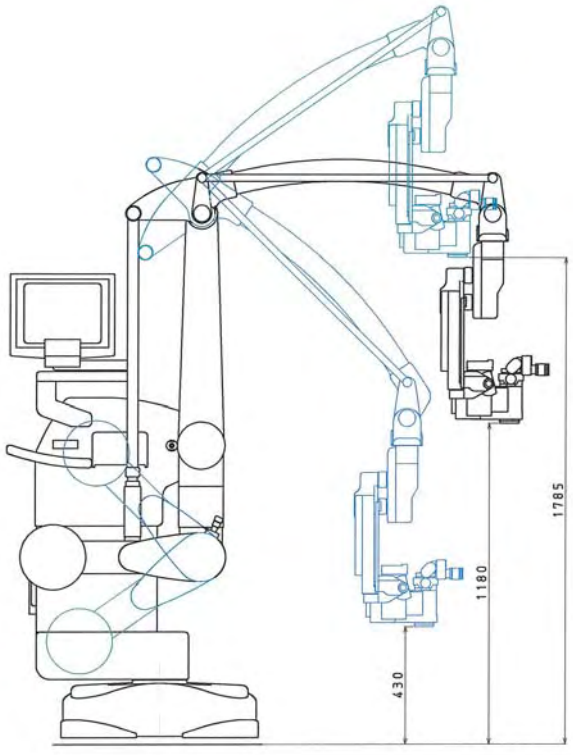
Conformity CE:	Directive 93/42/EEC concerning medical devices: Class I, in conformity with Annex IX, Regulation 1, with reference to Regulation 10 and 12 of the directive. Medical electric equipment, Part 1: General requirements for safety ICE 60601-1; EN 60601-1; UL60601-1; CAN/CSA-C22.2 NO. 601.1-M90 Electromagnetic compatibility IEC 60601-1-2; EN 60601-1-2 According to the SQS Certificate, the Business Unit SD, within Leica Microsystems (Schweiz) AG, holds the management system certificates for the international standards ISO 9001:2000 / ISO 13485:2003 and ISO 14001:2004 relating to quality management, quality assurance and environmental management.

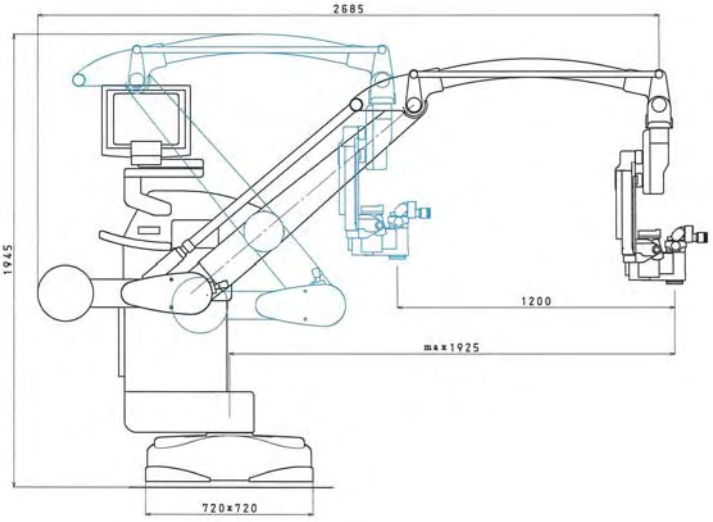
Environmental conditions

In use:	+10 °C to +40 °C +50 °F to +104 °F 30 % to 95 % relative humidity 500 mbar to 1060 mbar atmospheric pressure
Storage:	–40 °C to +70 °C –40 °F to +158 °F 10 % to 100 % relative humidity 500 mbar to 1060 mbar atmospheric pressure

Dimensional drawings







Principal description

Stand system

The stand system is based on the OH3. Improvements and new developments in mechanics and electronics leaded to a better functionality and an easier handling of the stand.

Mechanical damper

Different axes are equipped with damper parts. While the brakes are closed, the damper reduces vibrations to a minimum.

Electro magnetically brakes

The stand is blocked by 6 magnetically brakes. Pressing the rear handgrip knobs (all free button) releases all 6 brakes. The side handgrip knob allows releasing 3 brakes only: brakes 4, 5 and 6 or brakes 1, 2 and 3. The selection switch determines which brakes: in position “XYZ-free” the brakes 1, 2, 3 will release. In position “focus lock” the brakes 4, 5, 6 will release.
A mouth switch can also release the brakes 1, 2, 3.

Automatic balancing system

Install the accessories in the permitted weight range. Align the accessories in the working position. Press the “All Brakes” button on the CAN handle and move the optics carrier into the A-position. The mark must be pointing to A. Press the autobalancing push-button on the control unit. During the balancing procedure, the push-button flashes green and an acoustic signal sounds (can be deactivated in the service menu). The first balancing step is complete when the acoustic signal no longer sounds and the push-button is no longer flashing.
Press the “All Brakes” button on the CAN handle, tilt the optics carrier forwards 90° and move it into the B-position. The mark must be pointing towards B. Press the autobalancing push-button on the control unit again. During the balancing procedure, the push-button flashes green and an acoustic signal sounds. Balancing is complete when the acoustic signal no longer sounds and the push-button is no longer flashing. A dialog window indicates that balancing has been completed.

Intraoperative balancing

Intraoperative AC/BC balancing allows re-balancing during the operation. Re-balancing may be necessary if, for instance, an assistant`s tube is adjusted. Either axes A and C or B and C can be balanced.

A/C balancing

If work is performed only in the horizontal microscope position, re-balancing of the A/C axes may be sufficient. Press the “All Brakes” button on the CAN handle and move the optics carrier into the A-position. Press the start button for automatic AC/BC balancing on the swing arm. During the balancing procedure, the push-button on the control unit flashes green and an acoustic signal sounds. The A-axis is balanced first, followed by the C-axis.

B/C balancing

If work is performed only in the upright microscope position, re-balancing of the B/C axes may be sufficient. Press the “All Brakes” button on the CAN handle and move the optics carrier into the B-position. Press the start button for automatic AC/BC balancing on the swing arm. During the balancing procedure, the push-button on the control unit flashes green and an acoustic signal sounds. The B-axis is balanced first, followed by the C-axis.

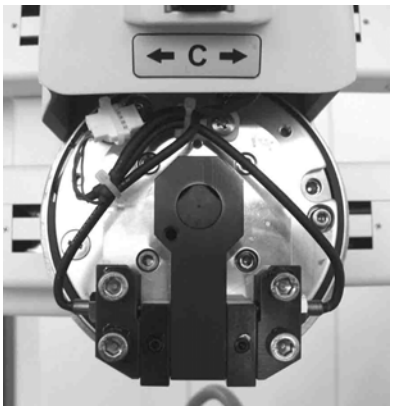
Correcting the balancing manually

For manual balancing, the axes can be moved manually using switches A, B, and C

Correcting the D-balancing manually

The D-balancing of the stand can be corrected with the "+" and "-" keys on the "Main" screen of the control unit.

Balancing mechanism



It consists of a lever, located between two mechanical limits. Two electrical switches indicate the position of the lever. The lever is mechanicaly connected to the appropriate axes and takes over the torque.
In all there are 3 balancing mechanism, one for the axis A and B, one for axis C and one for axis D.

Illumination

Press push-button for illumination. The illumination comes on and the push-button is lit green.

Adjusting the brightness

Brightness can be increased or decreased using the touch panel monitor or a handswitch/footswitch or CAN handle.

On the touch panel monitor:
Press the "+" or "-" key on the brightness adjustment bar for illumination or adjust the brightness directly in the bar.

BrightCare™

BrightCare™ is a safety function which automatically limits the maximum brightness depending on the working distance. Excessively bright light can, in combination with a short working distance, cause burns in patients.

Explanation of luminous energy:
The optics of the Leica M525 OH4 surgical microscope have a variable working distance between 207 and 470mm. The system is designed in such a way that it delivers sufficient light to produce a bright image even at a long working distance of 470mm. According to the formula $E_v = I_v / d^2$, luminous energy increases constantly to 510% as a function of a reduction in working distance from 470 to 207mm. (Ev = light intensity, Iv = brightness, d = distance from light source).
This means that less light is required to work with the microscope at a shorter distance than at a greater distance.
It is advisable to begin with low light output and increase the light intensity until an optimum level of illumination is achieved.
Explanation of heat release:
Heat from non-visible light (over 700nm) is filtered out of the light from the used xenon light source. Nevertheless, white light always releases heat. An excessive amount of white light can cause overheating of tissue and metallic objects.
This safety function can be deactivated by clicking the "Brightcare™" button. When the "Brightcare™" safety function is deactivated, the color of "Brightcare™" button changes from green to yellow.

Control elements

Illumination unit:

Main switch	power on/off of Leica OH4 system

Stand control unit:

User interface	controlling the microscope system and stand system
Pushbutton illumination	starting/stopping the Xenon illumination
Pushbutton auto-balance	starting the auto-balance procedure

Swing carrier:

Toggle switch C-balance	balancing C-axis manually
Push button	AC / BC autobalance

A/B slide:

Toggle switch A-balance	balancing A-axis manually
Toggle switch B-balance	balancing B-axis manually

Handgrips:

Rear switch	releasing all brakes
Side switch	releasing 3 brakes
Zoom up/down	operating zoom up/down of M525 microscope
Focus up/down	operating focus up/down of M525 microscope
Joystick	operating DI C500- and other functions or moving X,Y

Options:

footswitch	to be connected to the M525 control unit: user defined function
Mouth switch	releasing 3 brakes

Indication operating state

Illumination unit:

Main switch illumination	
Dark:	switched off condition or no AC power connected or defective fuse
Shines green:	main voltage present at transformer

Stand control unit:

Pushbutton illumination	
Dark:	illumination not activated
Shines green:	illumination is activated
Flashes green:	door not closed
Pushbutton auto-balance	
Flashes green:	auto-balance in progress

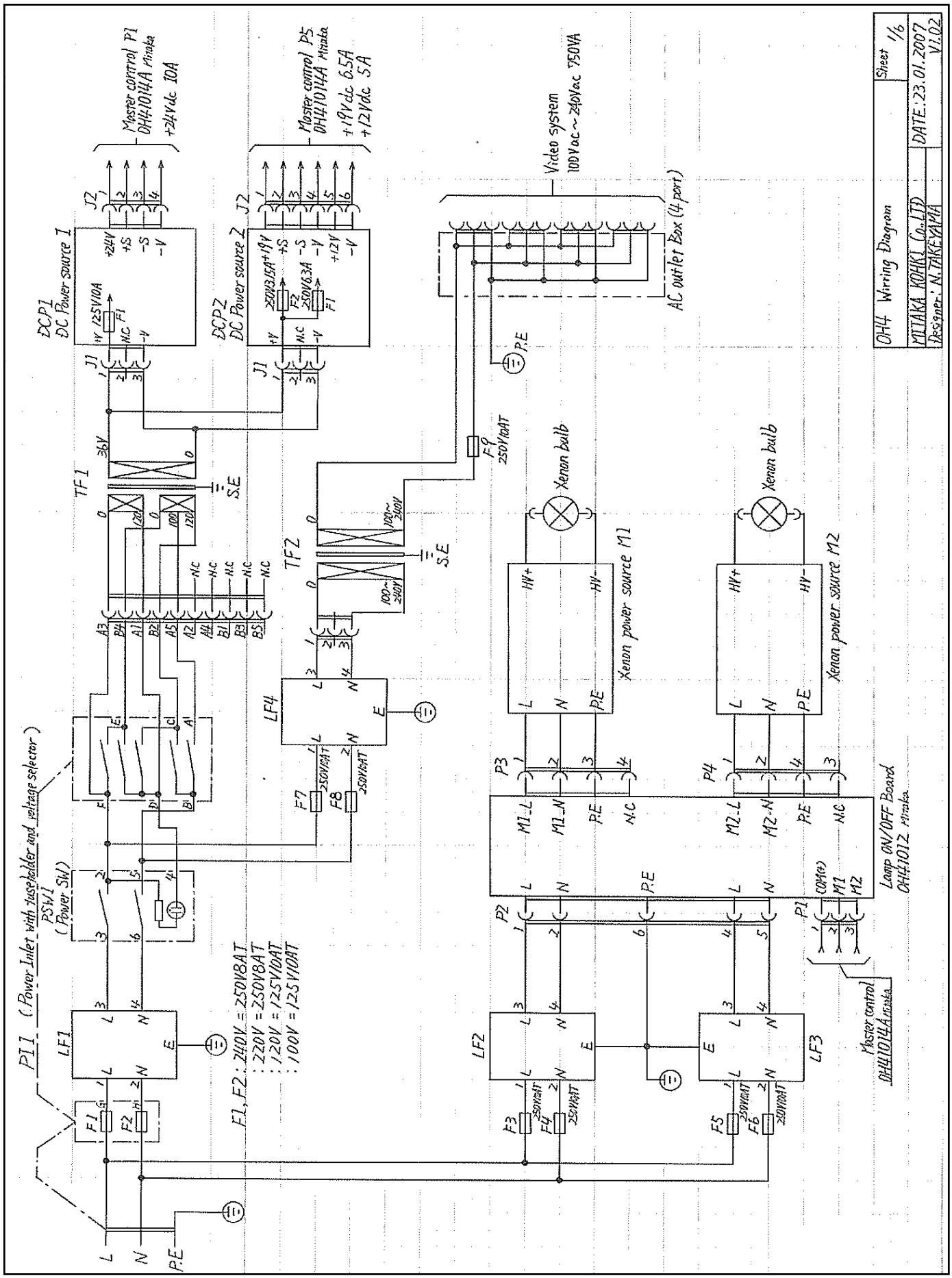
Buzzer:

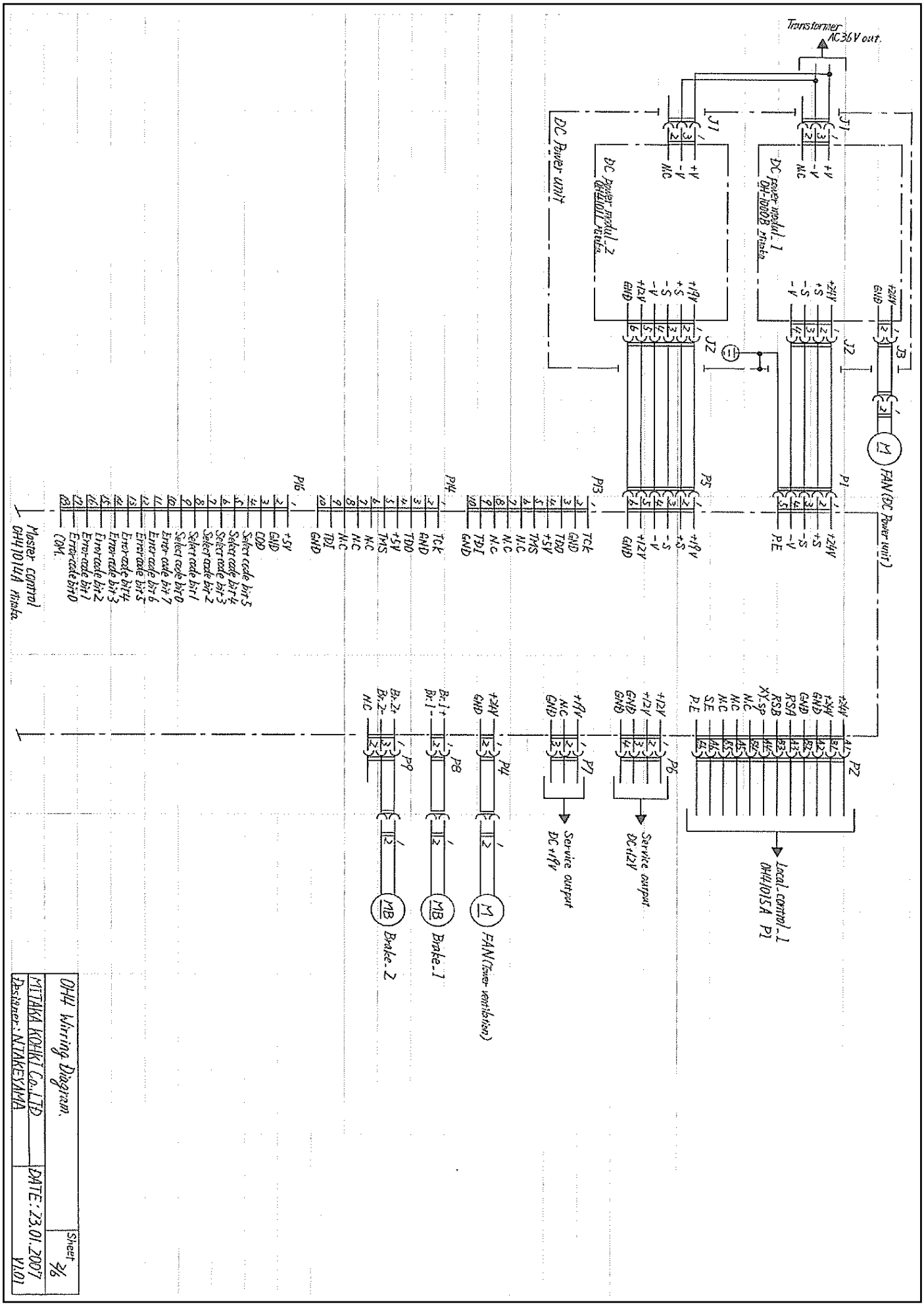
Sounds	Auto-balance in progress

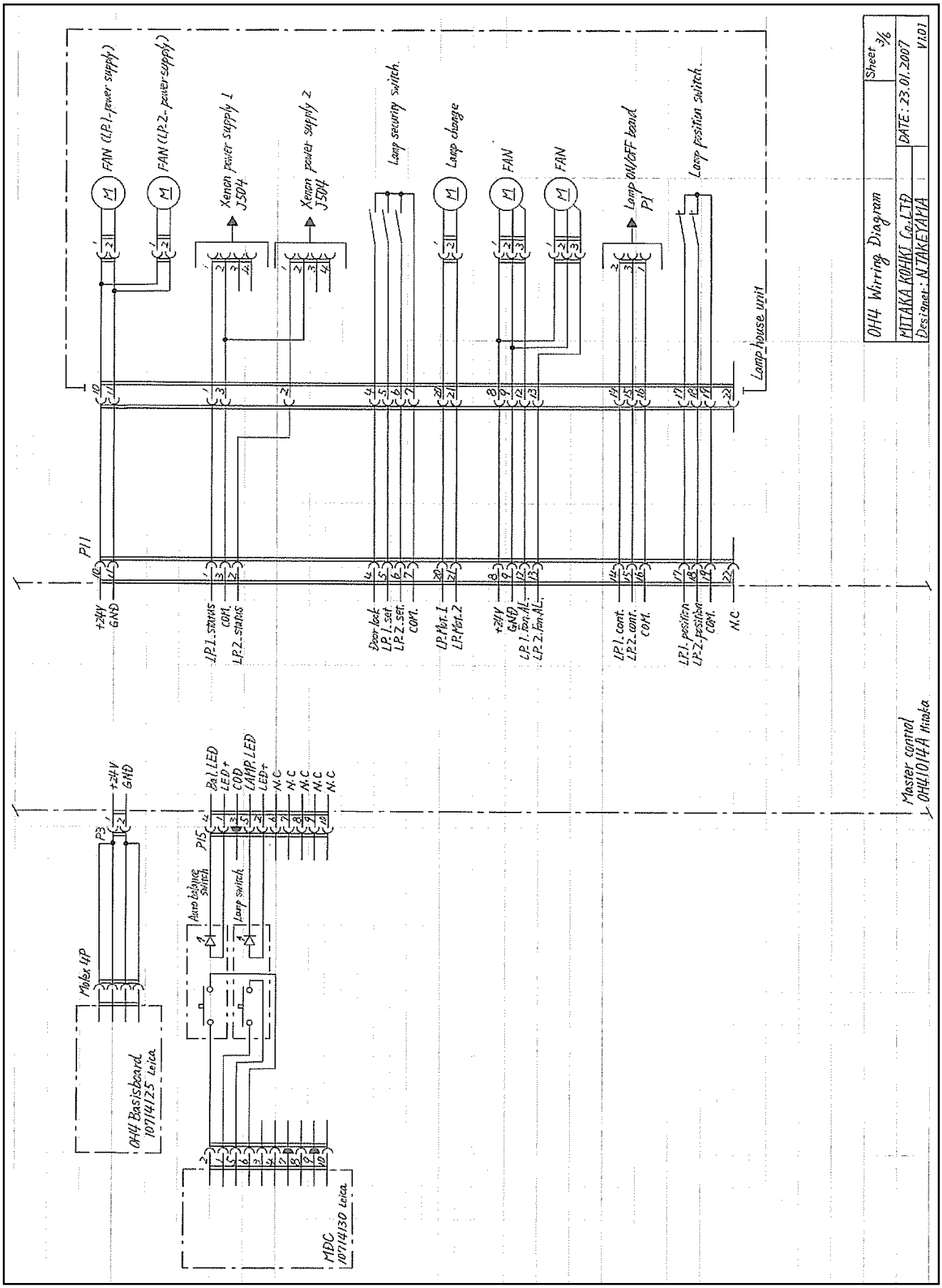
02. Wiring diagram - Leica M525 OH4

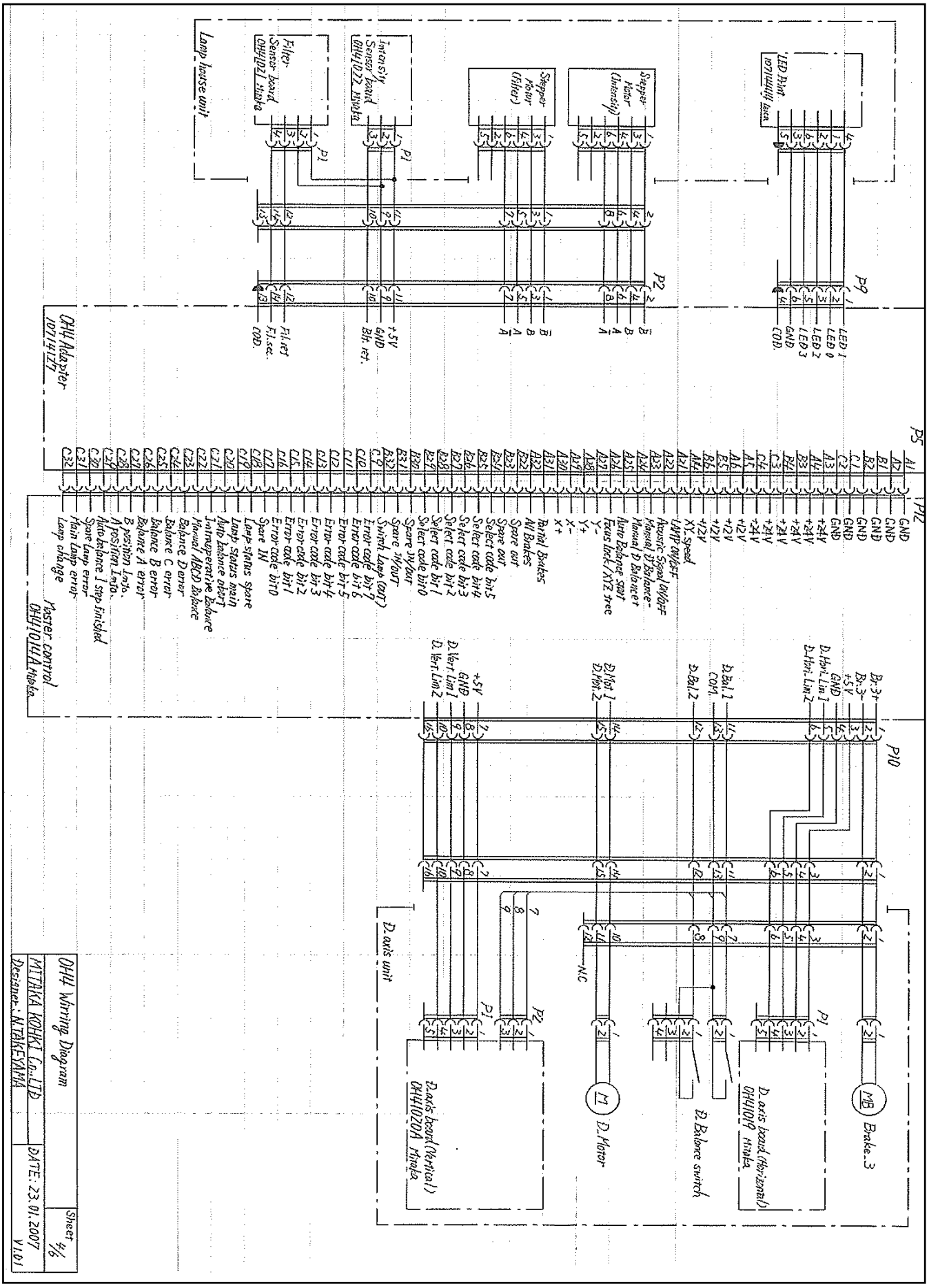
Table of content

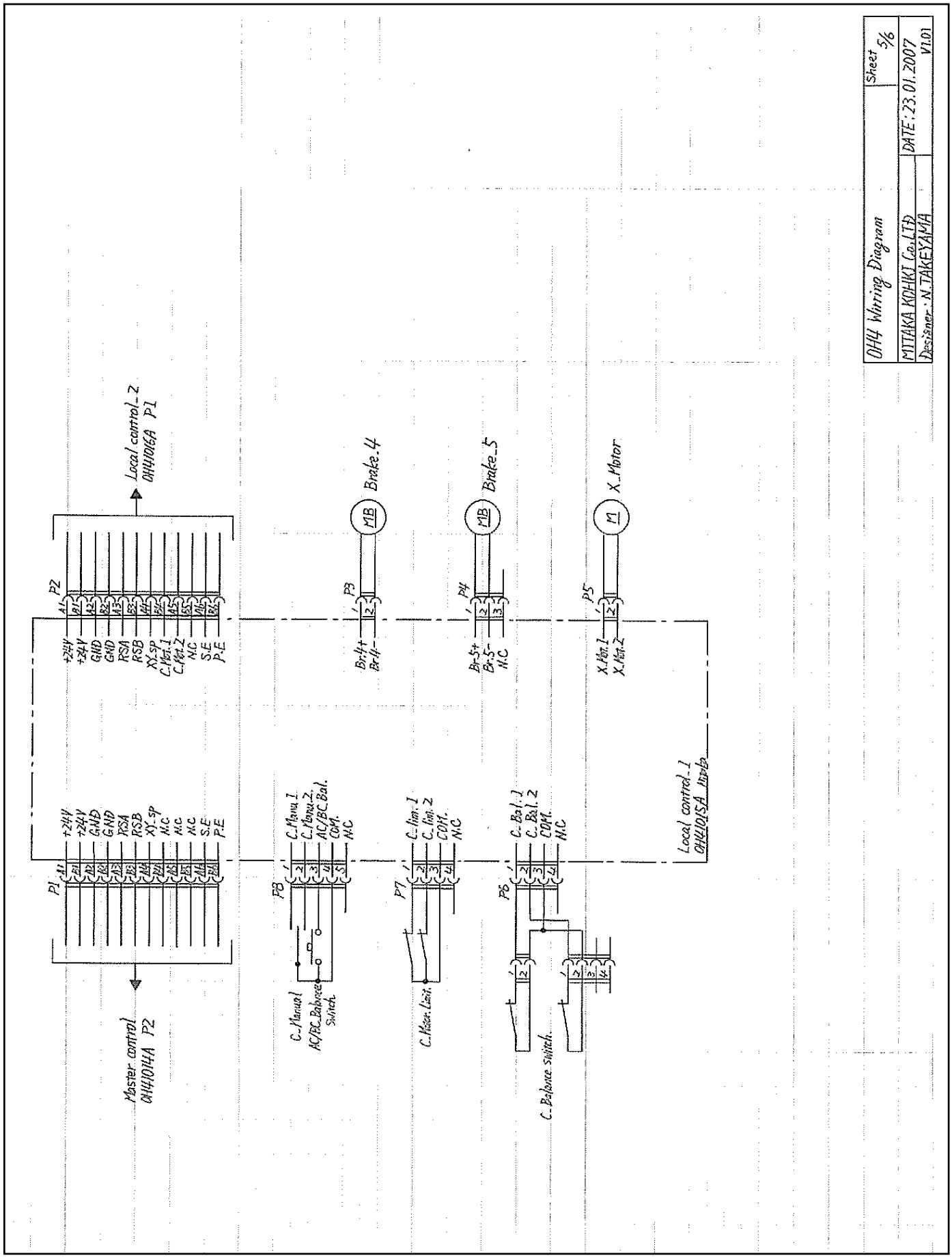
Chapter	Page
Power supply	2-1
Master controller, DC power unit	2-2
Master controller, light source	2-3
Master controller, OH4 adapter, d-axis unit	2-4
Local control_1 (axis 4)	2-5
Local control_2 (swing carrier)	2-6
Block diagram	2-7

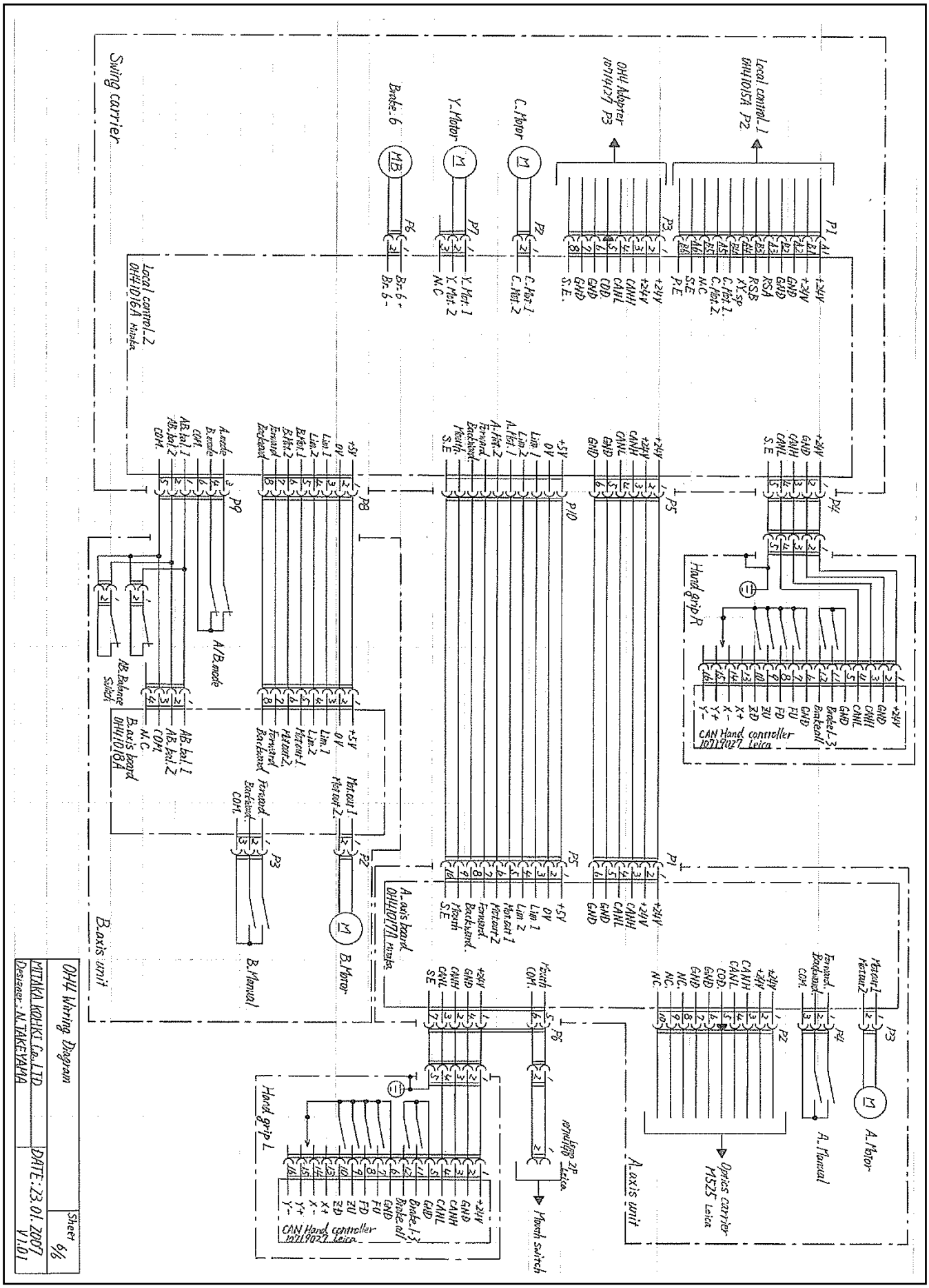

OH4 Wiring Diagram
Sheet 1/6
MITAKA KOHKI Co.,LTD
DATE: 23.01.2007
Designer: N.TAKEYAMA
V1.02
DCP1 DC Power source 1
DCP2 DC Power source 2
Master control P1 OH4101144 mitaka +24Vdc 10A
Master control P2 OH4101144 mitaka +19Vdc 6.5A +12Vdc 5A
Video system 100Vac~240Vac 750VA
AC outlet Box (4 port)
Xenon bulb
Xenon power source M1
Xenon power source M2
Lamp ON/OFF Board OH4101012 mitaka
Master control OH4101144 mitaka
PI1 (Power Inlet with fuseholder and voltage selector)
PSW1 (Power SW)
TF1
TF2
LF1
LF2
LF3
LF4
F1, F2 : 240V = 250V 8AT
: 220V = 250V 8AT
: 120V = 125V 10AT
: 100V = 125V 10AT
L
N
P.E


Transformer AC36V out.
DC power module-1 OH-1000B Hitachi
DC power module-2 OH-1001 Hitachi
DC Power unit
FAN (DC Power unit)
Local control-1 OH4/1013A P1
Service output DC+12V
Service output DC+19V
FAN (Power ventilation)
Brake-1
Brake-2
Master control OH4/1014A Hitachi
OH4 Wiring Diagram.
MITAKA KOHKI Co.,LTD
DATE: 23.01.2007
Designer: NITAKEYAMA
V1.01
Sheet 2/6

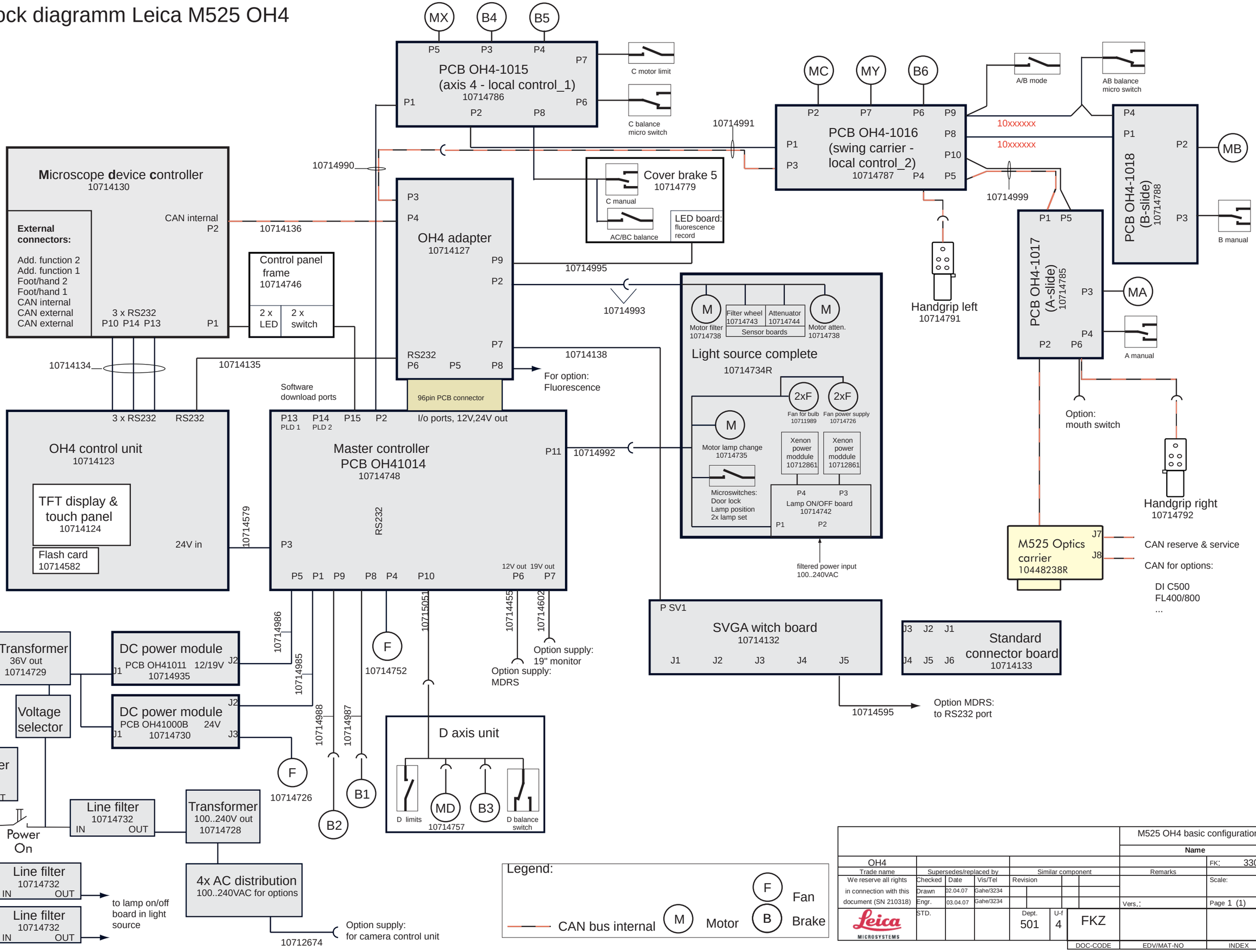

OH4 Wiring Diagram
MITAKA KOHKI Co.LTD
Designer: NTAKEYAMA
DATE: 23.01.2007
Sheet 3/6
V1.01
Master control
OH4(0144 mitaka
Lamp house unit
FAN (LP.1-power supply)
FAN (LP.2-power supply)
Xenon power supply 1
J504
Xenon power supply 2
J504
Lamp security switch.
Lamp change
FAN
FAN
Lamp ON/OFF board
P1
Lamp position switch.
P11
+24V
GND
LP.1_status
COM.
LP.2_status
Door lock
LP.1_set.
LP.2_set.
COM.
LP.Mot.1
LP.Mot.2
+24V
GND
LP.1_fan AL.
LP.2_fan AL.
LP.1_cont.
LP.2_cont.
COM.
LP.1_position
LP.2_position
COM.
N.C
P3
+24V
GND
Motor UP
OH4 Basisboard
10714125 Leica
P15
Bal.LED
LED+
COD
LAMP LED
LED+
N.C
N.C
N.C
N.C
N.C
Auto balance switch
Lamp switch
MDC
10714130 Leica


OH4 Wiring Diagram
MITAKA KOHKI Co.,LTD
Designer: N.TAKEYAMA
DATE: 23.01.2007
V1.01
Sheet 1/6
OH4 Adapter 10071411Z7
Master control OH4I01044 Mitaka
Lamp house unit
Filter Sensor board OH4I021 Mitaka
Intensity Sensor board OH4I022 Mitaka
Stepper Motor (Intensity)
Stepper Motor (Filter)
LED Print 10071444Y Leica
P5
P9
P2
P1
P10
Brake-3
D. axis board (Horizontal) OH4I019 Mitaka
D. Balance switch
D. Motor
D. axis board (Vertical) OH4I020A Mitaka
D. axis unit
N.C.


OH4 Wiring Diagram
Sheet 5/6
MITAKA KOHKI Co.,LTD
DATE: 23.01.2007
Designer : N.TAKEYAMA
V1.01
Local control_2
OH4/0164A P1
Master control
OH4/0144A P2
Local control_1
OH4/0154A P1
Brake_4
Brake_5
X_Motor
C_Manual
AC/BC_Balance
Switch
C_Nom_Limit
C_Balance switch
+24V
+24V
GND
GND
RSA
RSB
XY_SP
N.C
N.C
N.C
S.E
P.E
C_Manu.1
C_Manu.2
AC/BC_Bal.
COM.
N.C
C_Nom.1
C_Nom.2
COM.
N.C
C_Bal.1
C_Bal.2
COM.
N.C
Br-4+
Br-4-
Br-5+
Br-5-
N.C
X_Mot.1
X_Mot.2


OH4 Wiring Diagram
Sheet 6/6
MITAKA KOHKI Co.,LTD
DATE: 23.01.2007
Designer: N.TAKEYAMA
V1.01
Swing carrier
Local control 1
OH4101SA P2
OH4 Adapter
10714027 P3
C.Motor
Y-Motor
Brake-6
Local control 2
OH4101SA Mirror
Hand grip R
CAN Hand controller
10719027 Leica
A/B mode
A/B Balance Switch
A/B axis board
OH4101018A
B.axis unit
B.Motor
B.Manual
A.axis board
OH4101017A mirror
A.axis unit
A.Motor
A.Manual
Optics carrier
M525 Leica
Hand grip L
CAN Hand controller
10719027 Leica
Brake off
Mouth switch

Block diagramm Leica M525 OH4



								M525 OH4 basic configuration	
								Name	
OH4									FK: 330
Trade name	Supersedes/replaced by			Similar component				Remarks	
We reserve all rights	Checked	Date	Vis/Tel	Revision					Scale:
in connection with this	Drawn	02.04.07	Gahe/3234						
document (SN 210318)	Engr.	03.04.07	Gahe/3234					Vers.:	Page 1 (1)
Leica MICROSYSTEMS	STD.			Dept. 501	U-f 4	FKZ			
						DOC-CODE		EDV/MAT-NO	INDEX

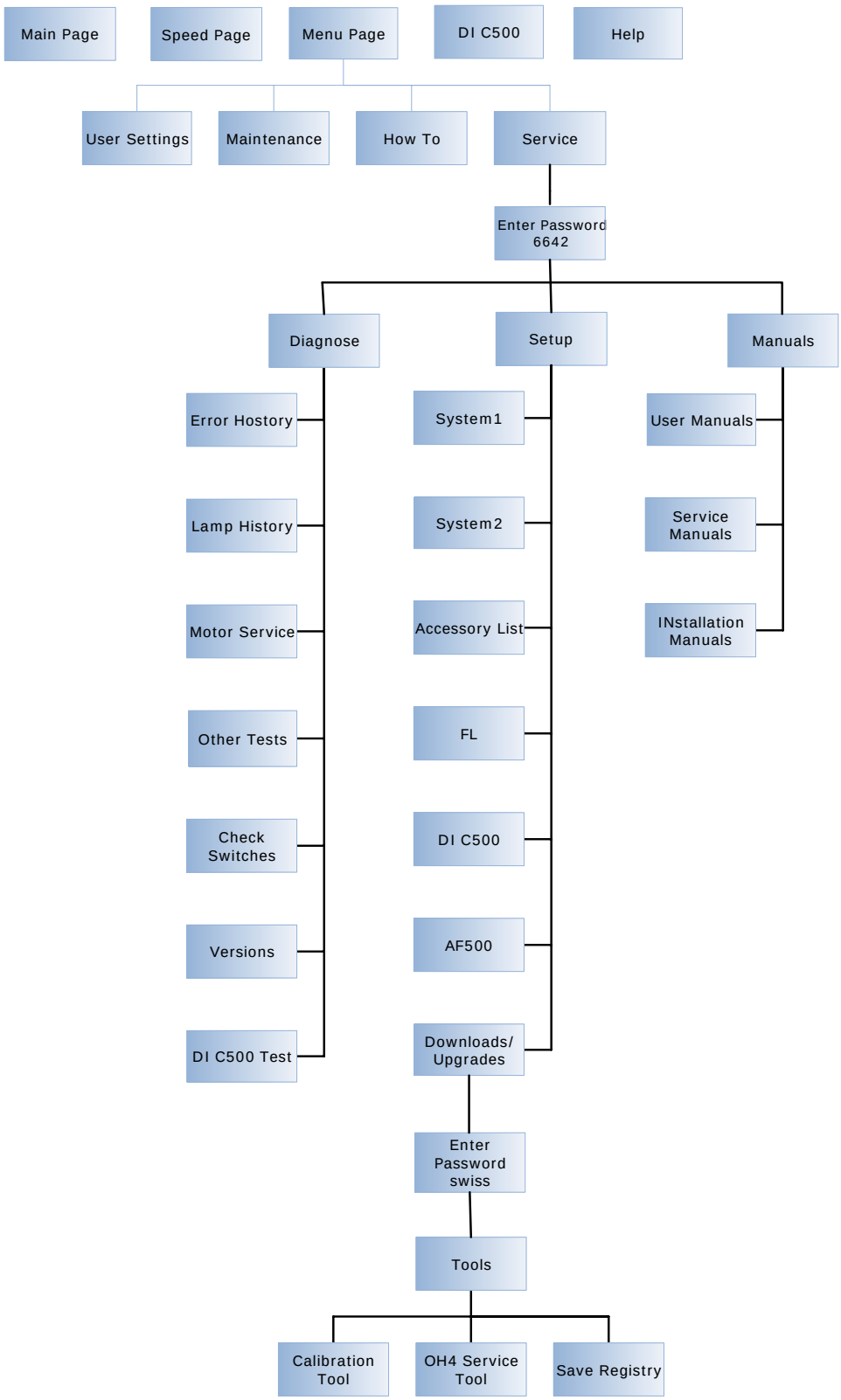
3. Service Programs - Leica M525 OH4 Control unit

Table of content

Chapter	Page
3.1 Structure of Menu/Service Menu	3-1
3.2 How to enter the Service Menu	3-2
3.2.1 General Menu Information	3-2
3.3 Service Menu for M525 OH4 Control unit	3-3
3.3.1 Diagnose Menu	3-4
3.3.2 Setup menu	3-9
3.3.3 Manuals	3-13
3.3.4 Download/Upgrades	3-13
3.3.4.1 Calibrating the touch panel	3-14
3.3.4.2 OH4 Service Tool	3-16
3.3.5 USB Stick	3-25
3.3.6 Update the Service Tool	3-29

3 Service Software for Leica M525 OH4 Control Unit

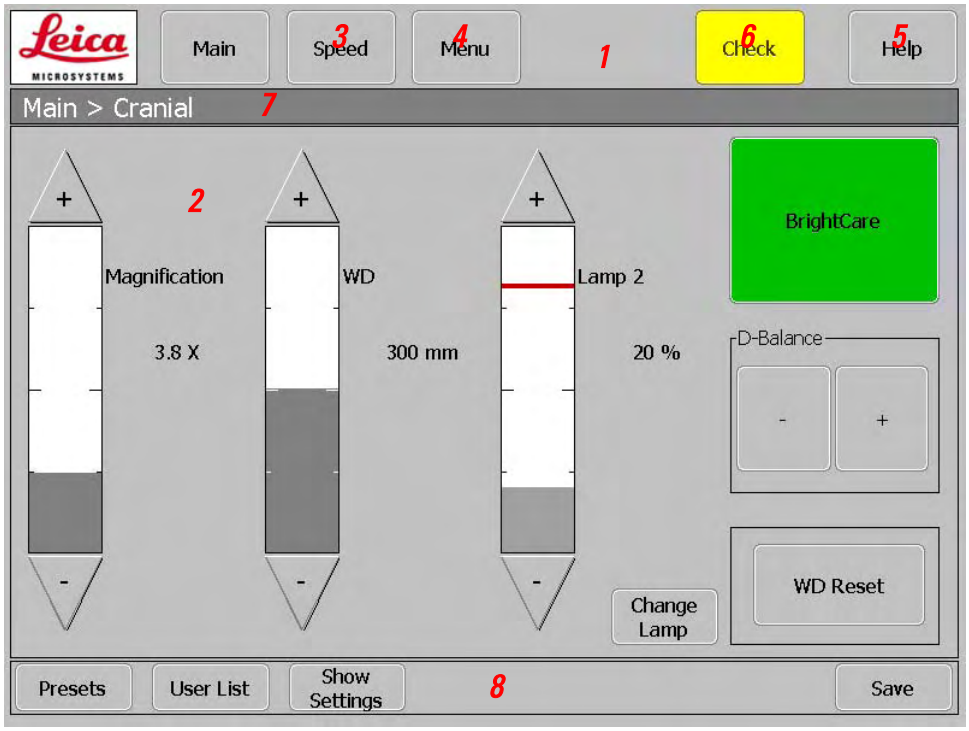
3.1 Structure of Menu/Service Menu



3.2 How to enter the Service Menu

3.2.1 General Menu Information

After start up process the Main page is displayed on Leica M525 OH4 Control Unit.



There is a quick access button (1) bar to go to the Main-, Speed-, Menu- and Help- pages.

The button “Main” (2) opens Main page which allows you to set Magnification, Working Distance and brightness.
You can also switch of Brightcare™, adjust D-Balance, activate WD reset function or change the lamp.

The button “Speed” (3) opens Speed page which allows you to adjust speed of Zoom, Focus and X/Y motor. You can also chose between Focus Lock and XYZ Free for Selected Brakes

The button “Menu” (4) opens Menu page. Here you find 4 buttons to go to “User settings” area, “Maintenance” Menu, “How To” pages and the “Service Menu”.

The button “Help” (5) in the quick access button bar opens a page with 16 “How to…”-pages. The “How To…” pages are quick reference guides to the most important topics.

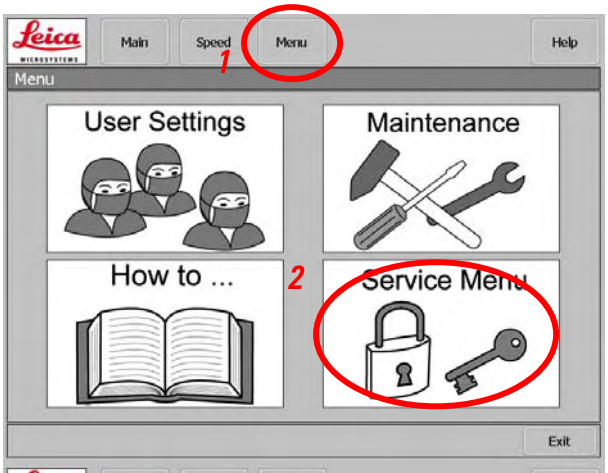
The button “Check” (6) shows up incase any errors occur. Press the “Check “ button to open a list with all error messages.

The Status line (7) gives you at any time the information of active user and/or current position in the menu.

Dynamic Button bar (8) offers you different functions depending from where you are in the menu.

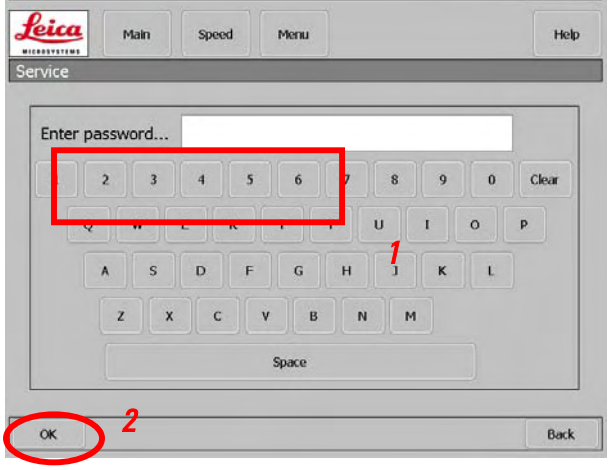
☞For detailed information please refer to the user manual Leica M525 OH4 (10 714 367).

3.3 Service Menu for M525 OH4 Control Unit



Press “Menu” (1) button in quick access button bar to open Menu page.

Press the button “Service Menu” (2) on the “Menu” page.



A dialog window to enter the service password opens up.
Use keyboard to enter the password “6642”(1).
Then press the “OK” button (2) in the dynamic button bar.

The “Service” start page is opened. Choose on of the three menus “Diagnose” (see chapter 3.31 on page 3-4), “Setup” (see chapter 3.32 on page 3-9) or “Manuals” (see chapter 3.33 on page 3-13).

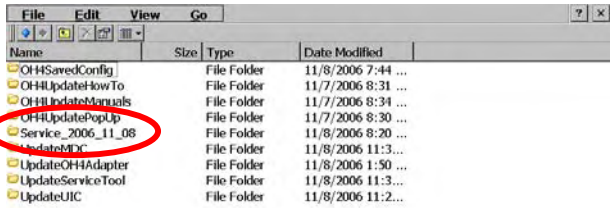
Press on of the buttons “Main”, “Speed” or “Menu” in the quick access button bar and you come back to the operating menu.

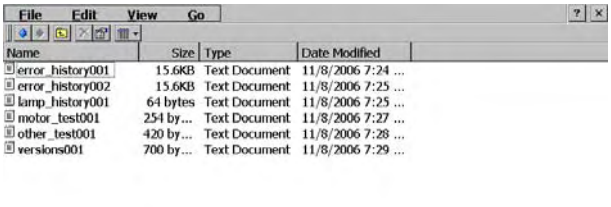
With the “Exit” button you go back to “Main” Page.

3.3.1 Diagnose Menu

☞ For downloading diagnostic data to a memory stick insert an USB stick before entering the service button.
When the USB stick is recognized by the system you will find a “Download” button on all diagnostic folders.

☞ When you do a download from one of the diagnose pages a folder with the name “Service_YYYY_MM_DD” is created. All download files will be saved in there.


File Edit View Go
Name Size Type Date Modified
OHISavedConfig File Folder 11/8/2006 7:44 ...
OHIUpdateHowTo File Folder 11/7/2006 8:31 ...
OHIUpdateManuals File Folder 11/7/2006 8:34 ...
OHIUpdatePopUp File Folder 11/7/2006 8:30 ...
Service_2006_11_08 File Folder 11/8/2006 8:20 ...
UpdateMDC File Folder 11/8/2006 11:3...
UpdateOH4Adapter File Folder 11/8/2006 1:50 ...
UpdateServiceTool File Folder 11/8/2006 11:3...
UpdateUIC File Folder 11/8/2006 11:2...


File Edit View Go
Name Size Type Date Modified
error_history001 15.6KB Text Document 11/8/2006 7:24 ...
error_history002 15.6KB Text Document 11/8/2006 7:25 ...
lamp_history001 64 bytes Text Document 11/8/2006 7:25 ...
motor_test001 254 by... Text Document 11/8/2006 7:27 ...
other_test001 420 by... Text Document 11/8/2006 7:28 ...
versions001 700 by... Text Document 11/8/2006 7:29 ...

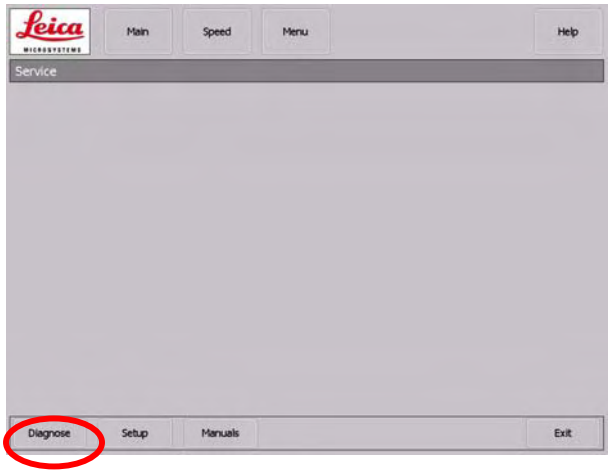
Plug in USB stick

Unscrew to remove cover.

Unscrew and remove fan holder plate. Unplug fan.

Use one of the two USB ports to plug in your USB stick.

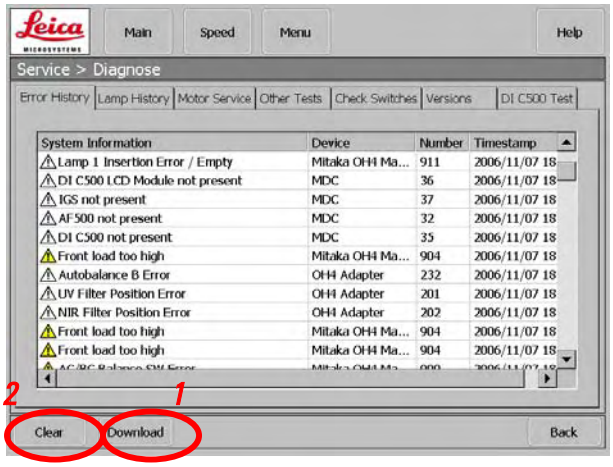
Switch on the microscope.



Diagnose folders

Click the button “diagnose” to open alle diagnose folders.

The “Back” button on all “Diagnose” pages will always bring you back to Service Menu Start page.

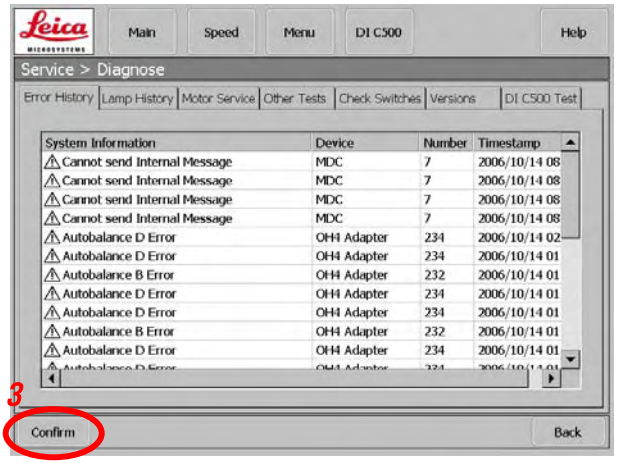


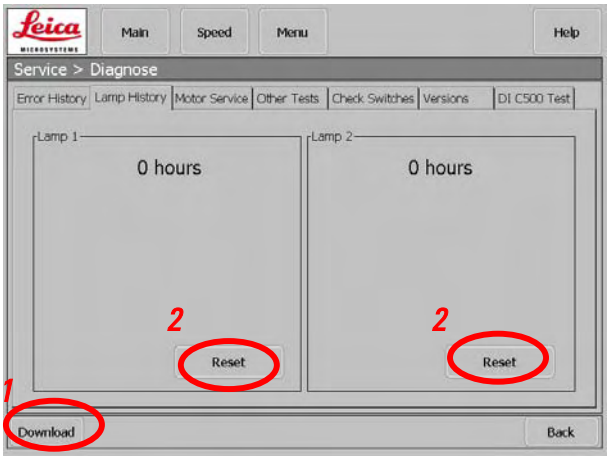
Error History

Select folder “Error History” to get a list of all error messages. Please refer to chapter 4 “fault finding”
of this manual. There you will find explanations of all error messages.

Press “Download” (1) for saving all error messages to the file “error_history001.txt” on your USB stick.

Press “Clear” (2) and continue with “Confirm” (3) to erase all error messages from this list.



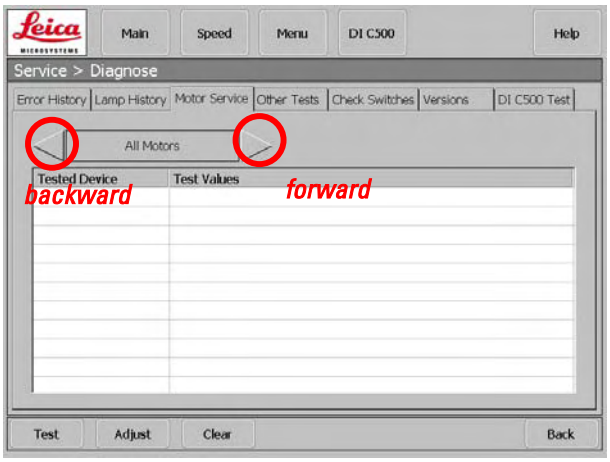


Lamp Histroy

Select folder “Lamp History” to open a page with hour meters for Lamp 1 (upper lamp) and Lamp 2 (lower lamp).

Press “Download” (1) for saving the lamp history data to the file”lamp_history001.txt” on your USB stick.

By double clicking the “Reset” button (2) you can reset the counter to 0 hours after replacing a defective lamp.

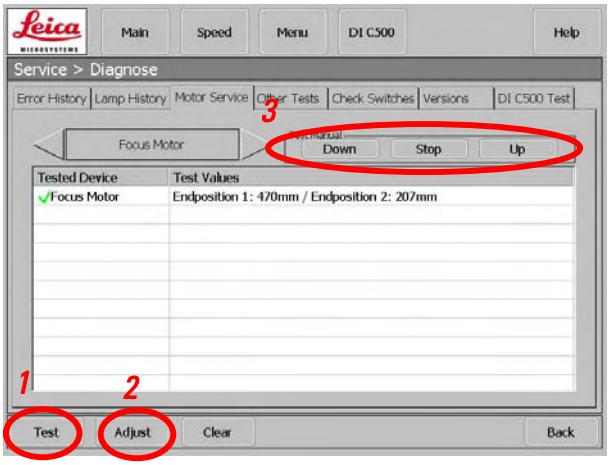


Motor Service

Choose folder ”Motor Service” to open a page for testing all motors and their range.

Use left or right arrow to scroll through selection field. Select the motor you want to test or adjust.

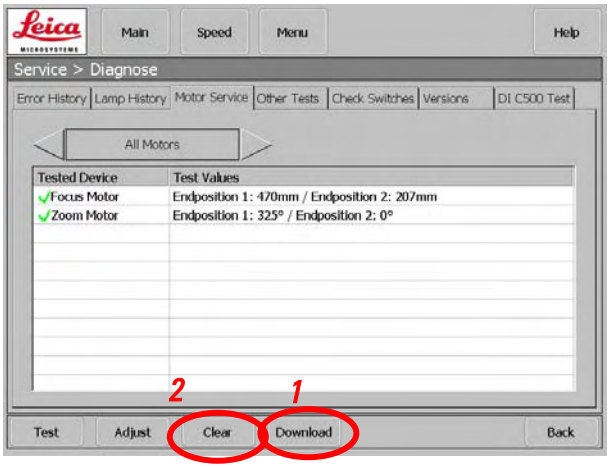
You can select from:
Zoom motor
Focus motor
X motor
Y motor
All Motors



Press the “Test” (1) or “Adjust” (2)Button . In the chart you will find the testing result of the chosen motor(s).
The green check means the tested motor is working faultless.

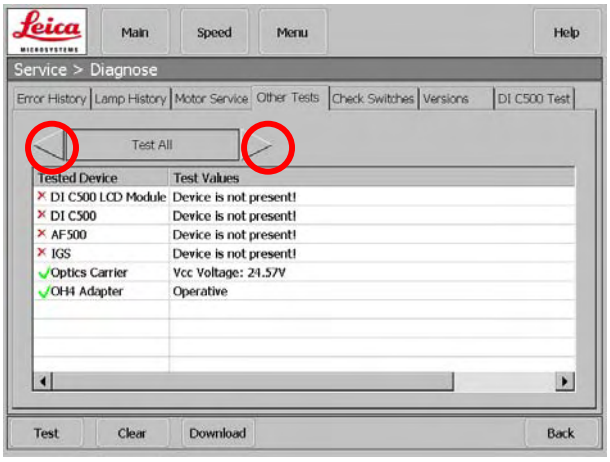
☞ If an error occurs please refer to chapter 4 “Fault finding” of this service manual.
You will also find the correct values for both ending positions there.

For manual testing of the selected motor (not available for “All Motors”) use the “Down”, “Up” and “Stop” buttons (3).



Press “Download” (1) for saving the motor test results and range to the file “motor_test001.txt “on your USB stick.

Press “Clear” (2) to erase all results from this list.

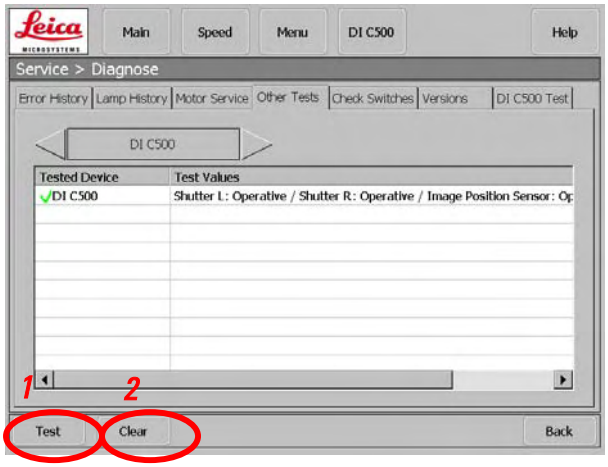


Other Tests

Select folder ”Other Tests” to open a page for testing all other microscope devices.

Use left or right arrow to scroll through selection field. Select the device you want to test .

You can select from: DI C500
DI C500 LCD
Module
AF500
IGS
Optics Carrier
OH4 Adapter
Filterwheel

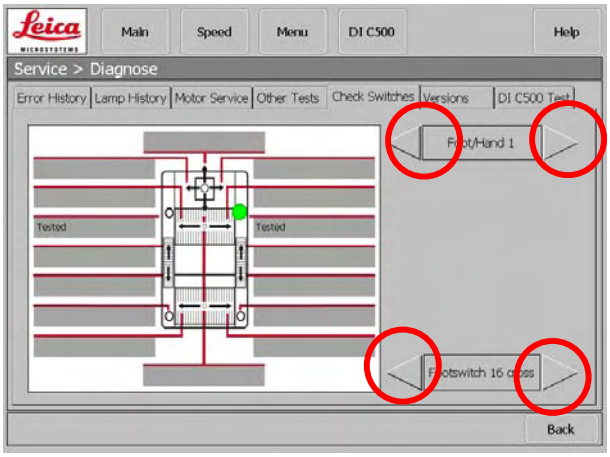


Press the “Test” button (1). In the chart you will find the testing result of the chosen device(s). The green check means the tested device is working faultless.

☞ You do not get results for the filterwheel positions. Filterwheel is turning to the desired position when tested.

Press “Download” (1) for saving the test results to the file “other_test001.txt “on your USB stick.

Press “Clear” (2) to erase all results from this list.

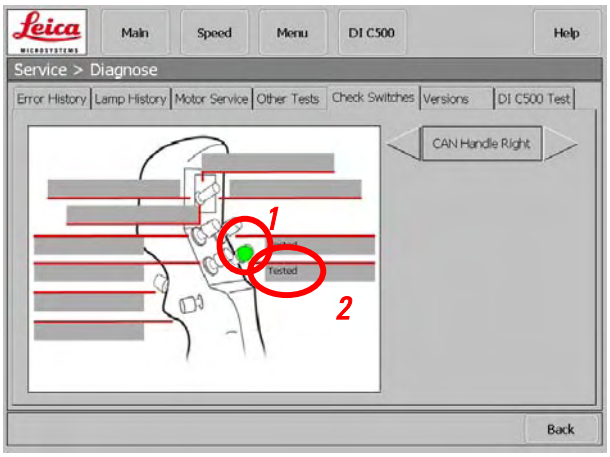


Check Switches

Select folder ”Check switches” to open a page for testing all switches.

Use left or right arrow to scroll through upper selection field first. Select the port for the foot-/ handswitch or one of the CAN handles.

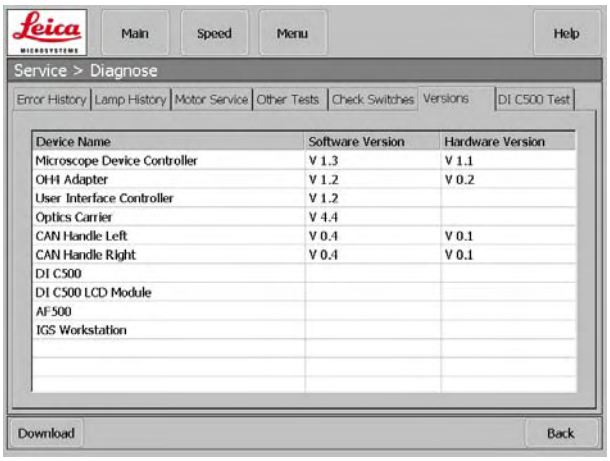
Selection: Foot/Hand 1
Foot/Hand 2
CAN Handle Right
CAN Handle Left



After selecting foot=/handswitch port 1 or 2 you have select the attached switch type:

Selection: Footswitch 16 cross
Footswitch 16 long
Footswitch 12 cross
Footswitch 12 long
Handswitch

Press the buttons on the chosen switch one after another. If the button works you will see a green dot (1) on for this button. The comment “tested” in the text field (2) shows that you have already tested the corresponding button.



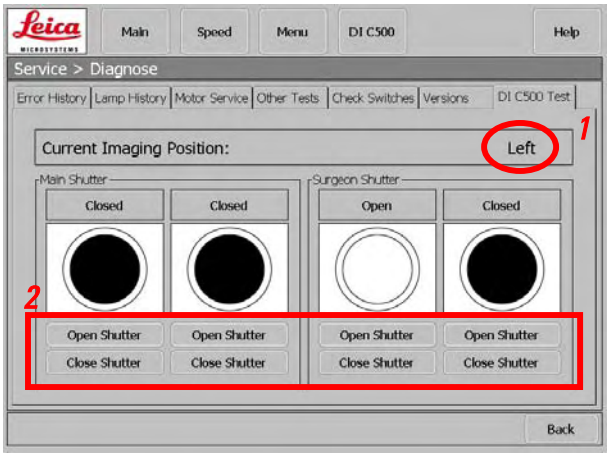
Versions

Select folder ”Versions” to get an overview of the software and hardware versions of all devices.

State 04/07

Device	SW Version	HW Version
MDC	1.5	1.1
OH4 Adapter	1.5	0.3
UIC	1.3	
Optics Carrier	4.4	

Press “Download” (1) for saving the test results to the file “versions001.txt “on your USB stick.



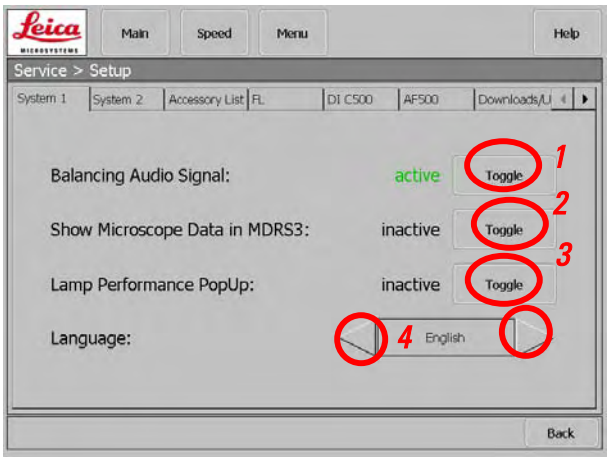
DI C500 Test

Select “DI C500” folder to check image position sensor and shutters of your DI C500.

You can find the information about current set image position (1) on the DI C500.

You can open and close 4 shutters manually (2). When opening and closing the shutters you will hear a click in your DI C500.

3.3.2 Setup Menu



System 1

Select “System 1” folder to do the following settings:

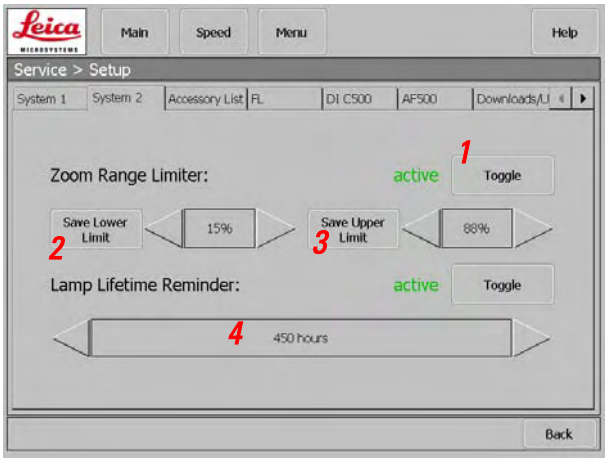
Press the “Toggle” button (1) to deactivate the balancing audio signal. Default setting is “active”.

Press the “Toggle” button (2) to activate the showing of microscope data on your MDRS3 system. Default setting is “inactive”

Our sensor shows the Xe lamp you are using
is defective.
We recommend you have the lamp tested by
Leica Service representative or replace it.
4

Press the “Toggle” button (3) the Lamp Performance PopUp (5). A PopUp will inform the user when lamp performance is going down under a certain level. Default setting is “inactive”

Use left or right arrow to scroll through language selection field (4).
To activate the selected language you have to restart the system.



System 2

Select “System 2” folder to do the following settings:

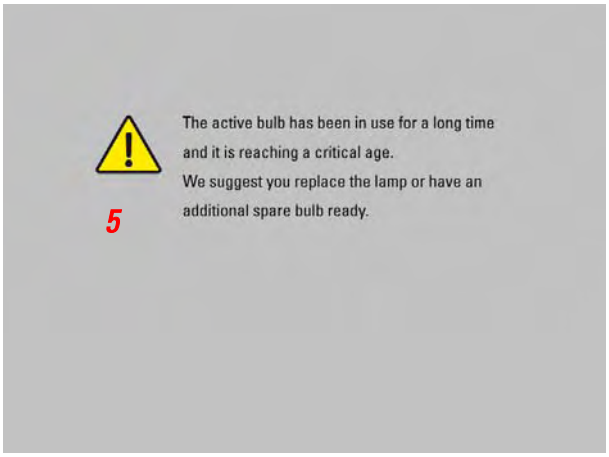
Zoom Range Limiter:

Press the “Toggle” button (1) to activate the Zoom Range Limiter. Default setting is “inactive”.

Press the arrow keys to adjust lower limit value for Zoom Range Limiter and then finish with “Save Lower Limit” (2). Lower range limit can be set between 0 to 15%. Default value is 0%.

Press the arrow keys to adjust upper limit value for Zoom Range Limiter and then finish with “Save Upper Limit” (3). Upper range limit can be set between 85 to 100%. Default value is 100%.

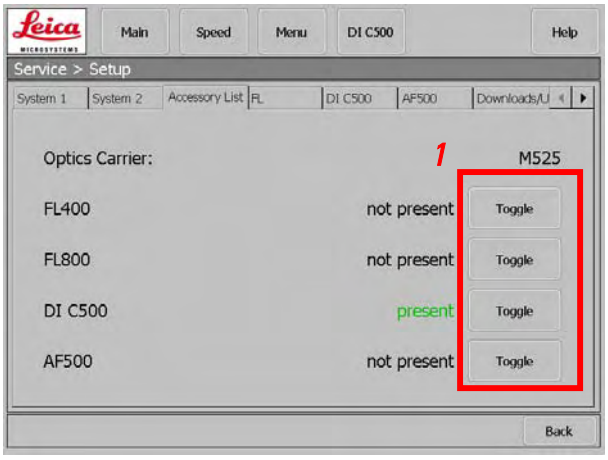
.


The active bulb has been in use for a long time
and it is reaching a critical age.
We suggest you replace the lamp or have an
additional spare bulb ready.
5

Lamp Lifetime Reminder:

Press the “Toggle” button (4) to activate the Lamp Lifetime Reminder. Default setting is “active”.
When the preset time passed by a Lamp Liftetime PopUp (5) will show up to remind the user of replacing the lamp.

Use left or right arrow to adjust time value for the PopUp to be shown up for the User. Default is 450 hours.



Accessory List

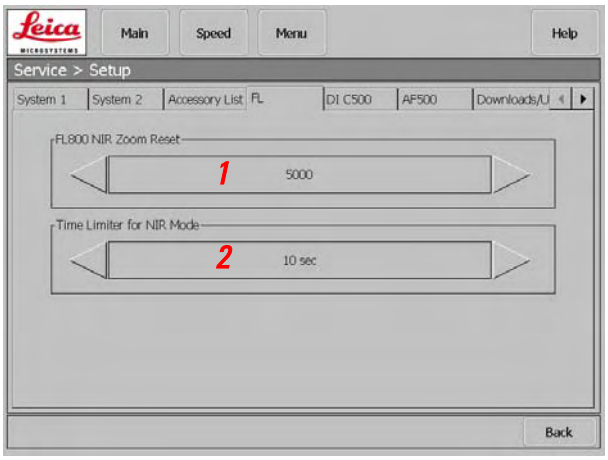
Select “Accessory List” folder to activate all device you use with your Leica M525 OH4.

Press the “Toggle” button (1) to activate all devices you use.

Default settings for all devices is “inactive”.

If you activate the FL400 or FL800 device you will have the additional information Whitelight/Bluelight/or NIR Light in the status line.

If you activate the DI C500 you will have the additional button DI C500 in quick access button bar.

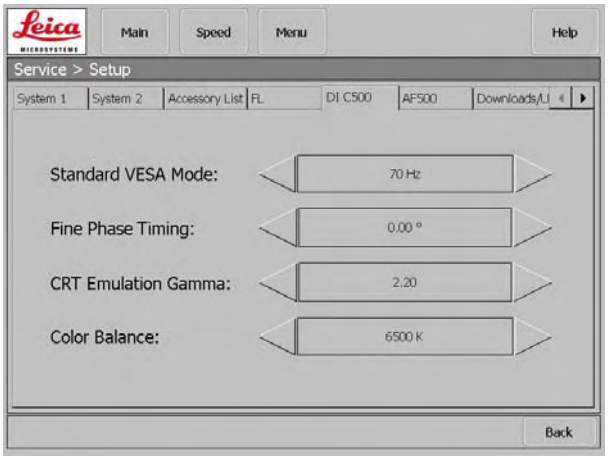


FL (Fluorescence)

Select “FL” folder to make the following fluorescence settings:

Use arrow keys to adjust “FL800 NIR Zoom Reset” (1) value. This value is the increment of reset motor position. Default value is 11776.

Use arrow keys to adjust “Time Limiter for NIR Mode” (2) value. This value is the time after which the NIR Mode is switched of automatically. Default value is 180 seconds.



DI C500

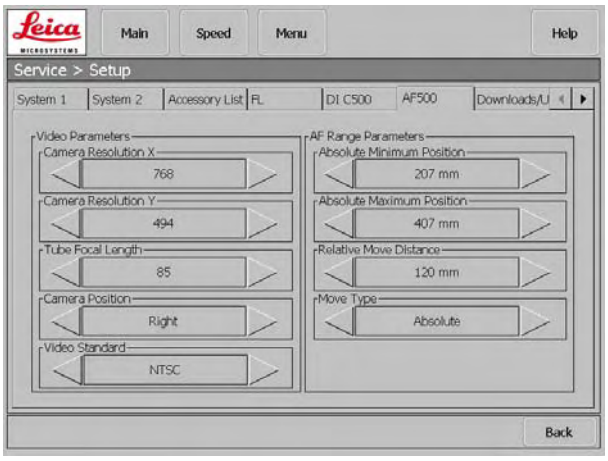
Select “ DI C500” folder to make the following DI C500 settings:

Standard VESA mode: Use arrow keys to select the frequency of incoming XGA signal. Default is 60 Hz.

Fine Phase Timing: Default is16.

CRT Emulation Gamma: Default is 2.2.

Color Temperature: Select color temperature of the microscope illumination. Default is 6500K (Xenon).



AF500

Select " AF500" folder to make the following settings for the Autofocus:

Video Parameters:

Camera Resolution X/Y : Set to the resolution of the camera you are using with the autofocus.

Tube Focal Length: Set to the focal length of the video adapter you are using for the autofocus camera. Default value is 60.

Camera Position: Set to the side where the camera is attached to the microscope. Default side is right.

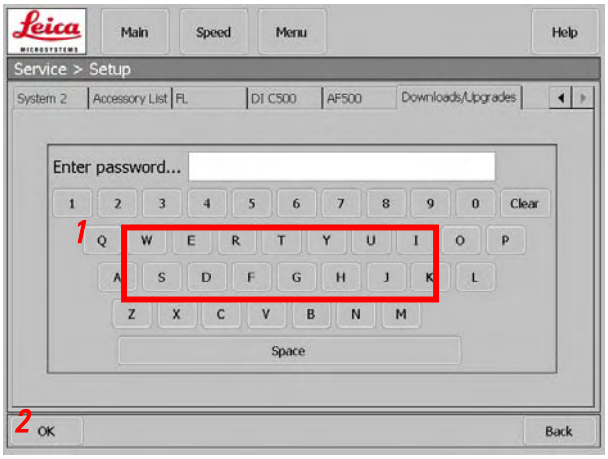
Video standard: Choose NTSC or PAL. Default is NTSC.

AF Range Parameters:

☞ If you use the Autofocus with a Leica M525 OH4 you can only work in the relative mode.

Relative Move distance: Set to a value between 1 and 200 mm.

Move Type: Set to "Relative" .



Downloads/Upgrades

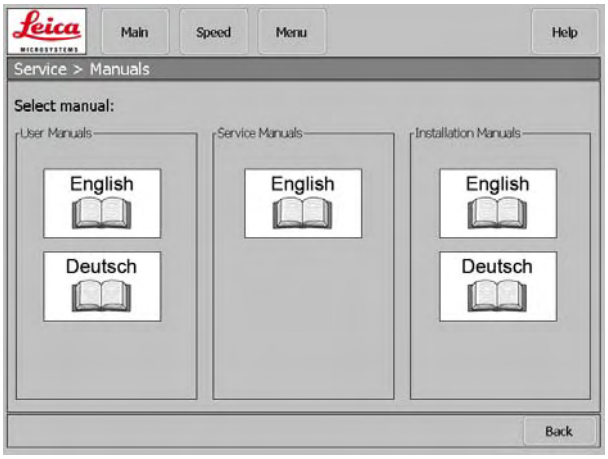
☞ Make sure that an USB stick (see chapter 3.35 on page 3-25) is connected before you open the register "Downloads/Upgrades".

A dialog window to enter the service password opens up.
Use keyboard to enter the password "swiss"(1).
Then press the "OK" button (2) in the dynamic button bar.

☞ You leave now the control unit mode and enter operating system Windows CE.

3.3.3 Manuals

Click on “Manuals” button to open the “Manuals” page.



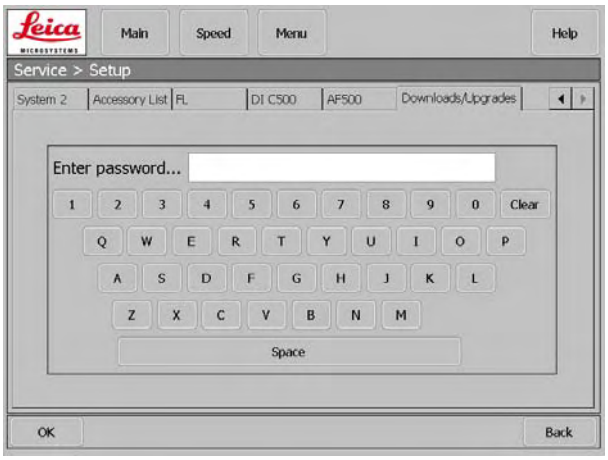
On this page you can open PDF files with the German and English user manual, the service manual (English only) and the German and English installation manuals.

Click on the referring icon to open the manual.

☞ This PDF viewer has only very simple functions. Some symbols might not be shown. Design and formatting might be disordered.

Click “back” button to go back to the service start page.

3.3.4 Download/Upgrades



Downloads/Upgrades

☞ Make sure that an USB stick (see chapter 3.35 on page 3-25) is connected before you open the register “Downloads/Upgrades”.

A dialog window to enter the service password opens up.
Use keyboard to enter the password “swiss”(1).
Then press the “OK” button (2) in the dynamic button bar.

☞ You leave now the control unit mode and enter operating system Windows CE.

Operating System

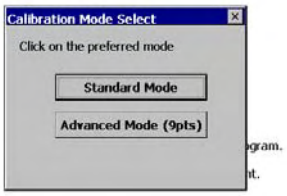
Double click the folder “Tools” to open…

Tools

There are three programs in the folder “Tools”:

Calibration Tool
OH4 Service Tool
Save Registry

3.3.4.1 Calibrating the touch panel



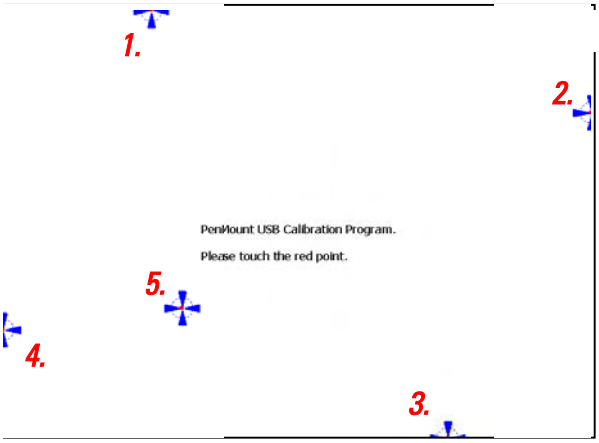
Calibration Tool

To adjust/calibrate your touch panel double click on the “Calibration Tool” icon.

Click on the “Standard Mode” button to start the calibration process.

☞We recommend to use a special touchpen for this procedure.

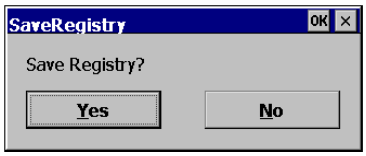
Follow the instructions on the screen…..



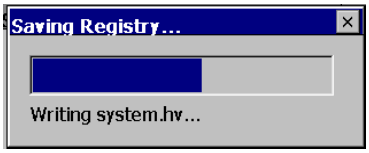
Tip in the middle of the crosshairs appearing on the screen.

☞ If you use advanced mode there a 9 steps instead of 5 in the standard mode.

To save the settings permanently in the operating system double click on the “Save Registry” icon.



Confirm with “yes” to save registry on hard disk.

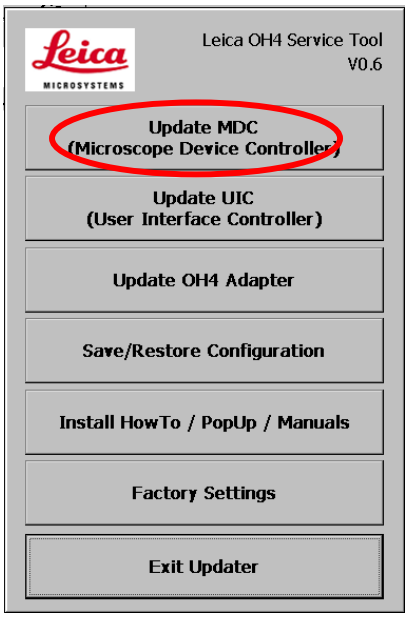


Wait for registry data to be saved.

3.3.4.2 OH4 Service Tool

☞Make sure that the you save configurations BEFORE updating any SW – the update procedure will reset all user configurations.

Double click on “OH4 Service Tool” icon to start the Leica OH4 Service Tool.

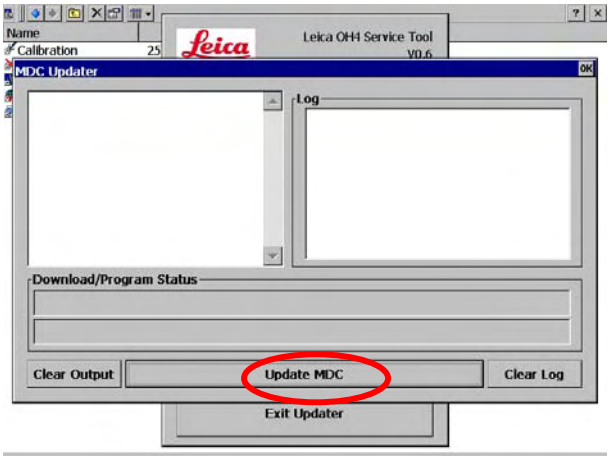


Update MDC

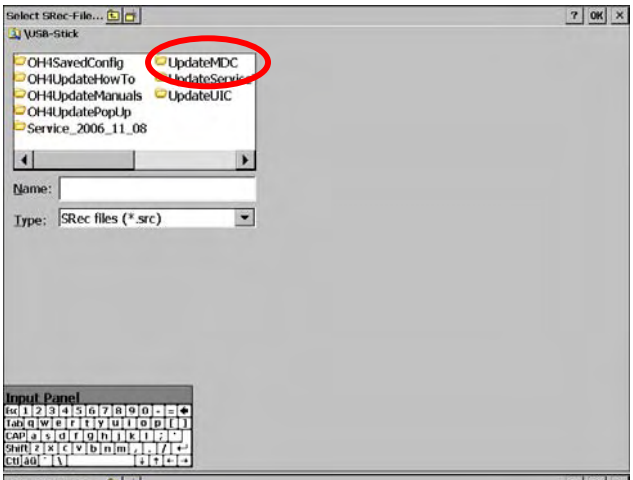
You can update the software of the Microscope Device Controller (MDC).

Make sure that an USB stick with latest update SW is plugged in. (see chapter 3.35 on page - 25)

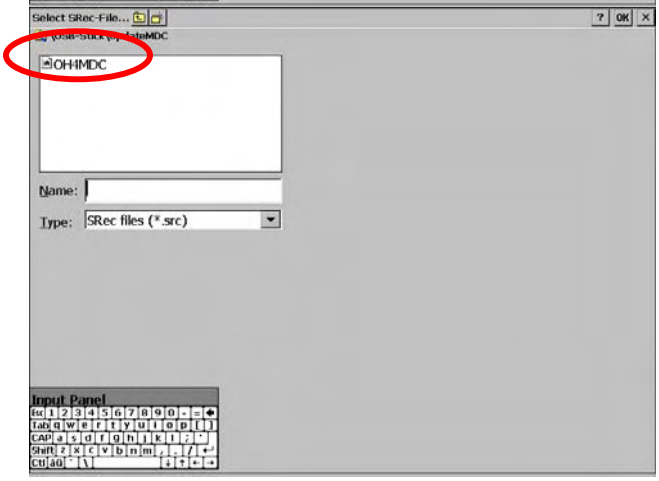
Press the button “Update MDC”



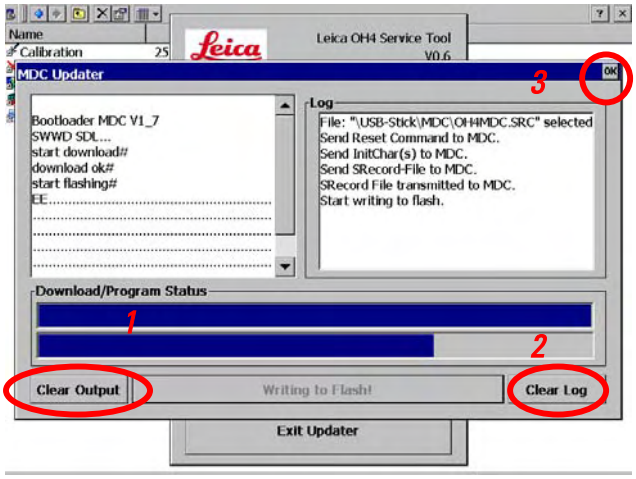
Press the button “Update MDC”



A dialog window “Select SRrec-File…” shows up. Double click on folder “UpdateMDC”



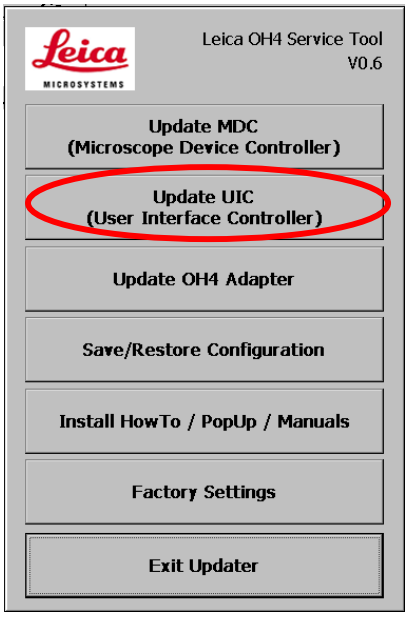
Double click on the “OH4MDC.exe” file to start the updating process.



Progress bar gives you information about the progress of updating process.

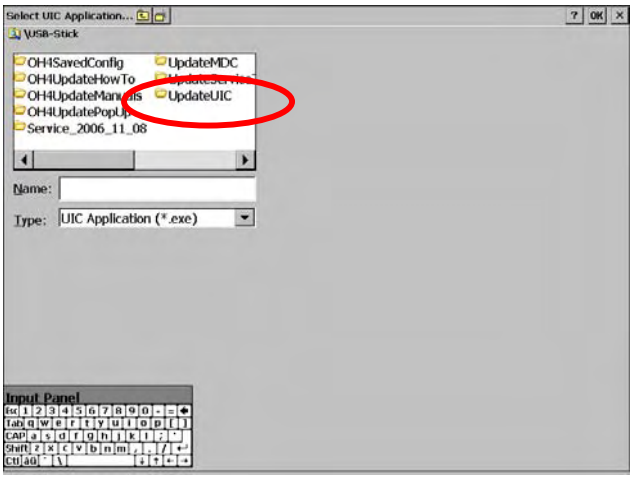
In the “Log” window you will find information about the update process.

If the MDC update process is finished (appr. 3 minutes), press “Clear Output” (1) and “Clear Log” (2). Than exit the window by clicking on “OK” (3) on the top right corner.

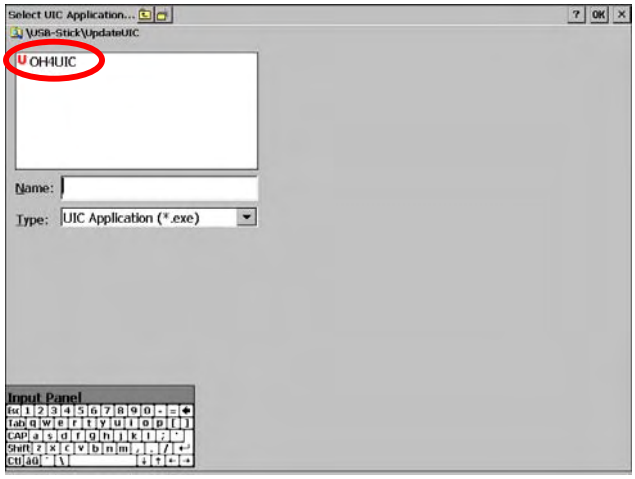


Update UIC

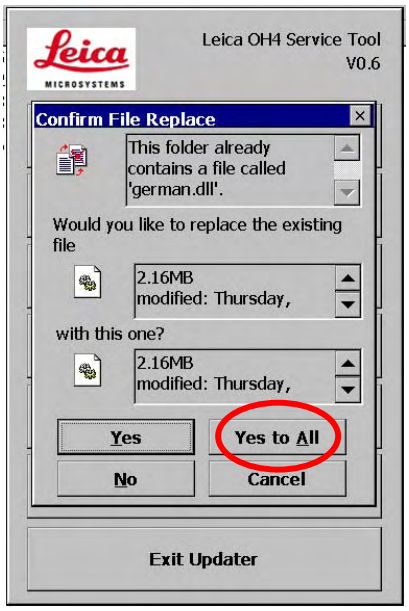
Press button “Update UIC” to update user interface controller.



A dialog window “Select UIC Application” shows up. Double click on “UpdateUIC”

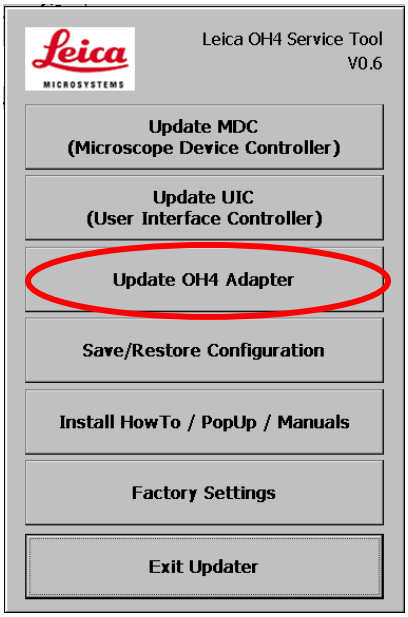


Double click on the “OH4UIC.exe” file to start the updating process.



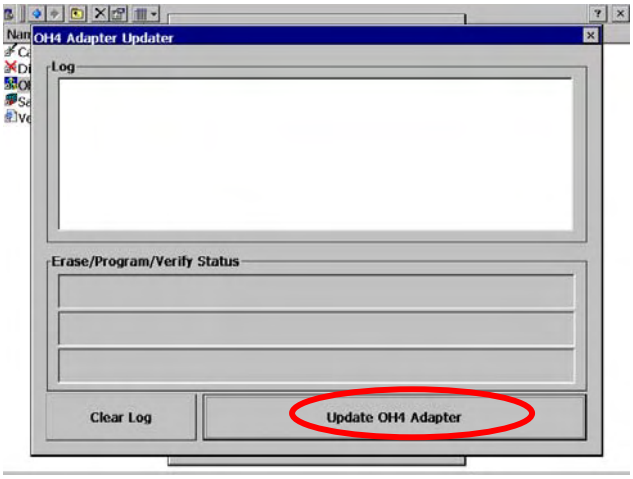
Confirm with “Yes to All”.

Progress bar gives you information about the progress of updating process.

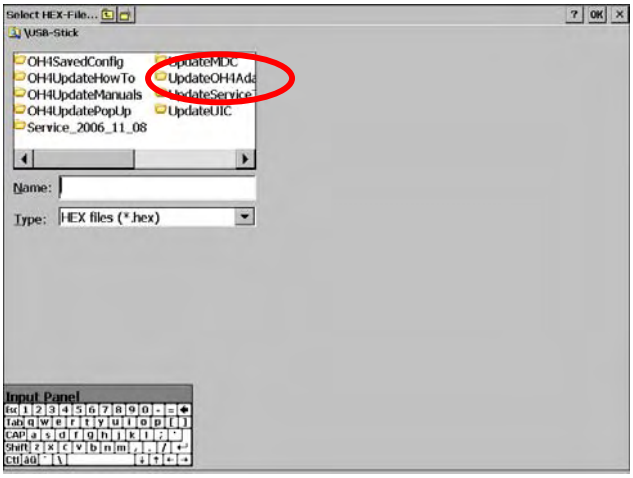


Update OH4 Adapter

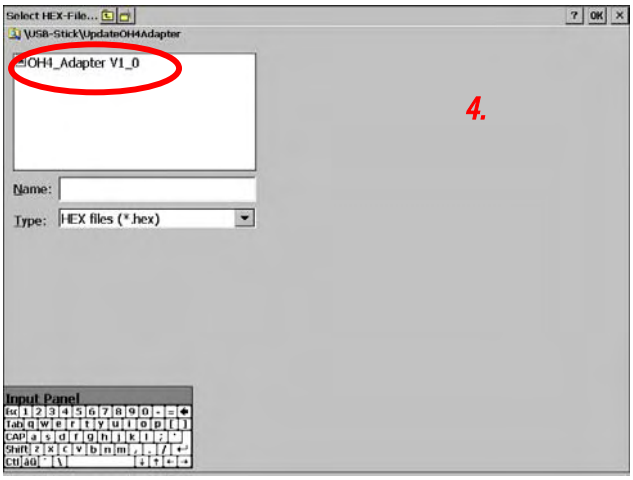
Click on “Update OH4 Adapter” to start update process.



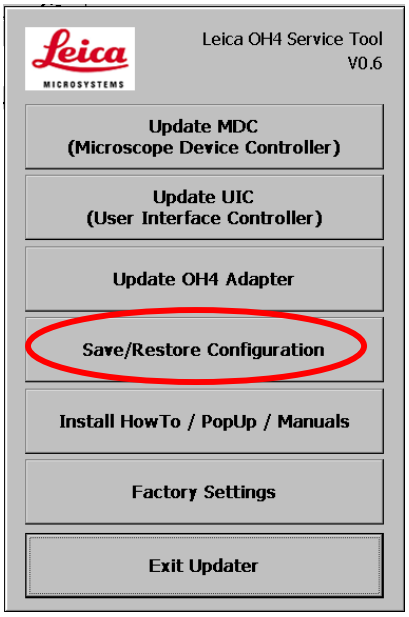
Click on “Update OH4 Adapter”.



A dialog window “Select Hex-File…” shows up.
Double click on folder “UpdateOH4Adapter”



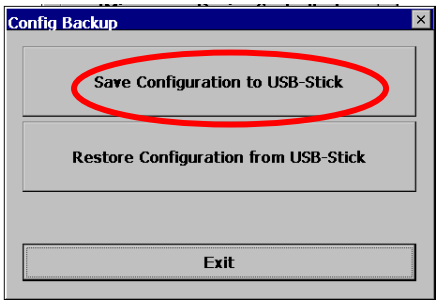
Double click on the “OH4_Adapter V1_x.hex” file to start the updating process.



Save / Restore Configuration

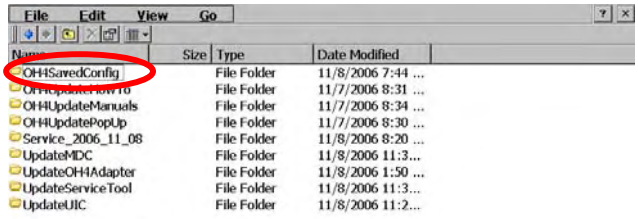
You can save the user settings of all 30 users that can be created and stored in the user list in the control unit to an USB stick.
Or you can upload user configurations from an USB stick back to the control unit.

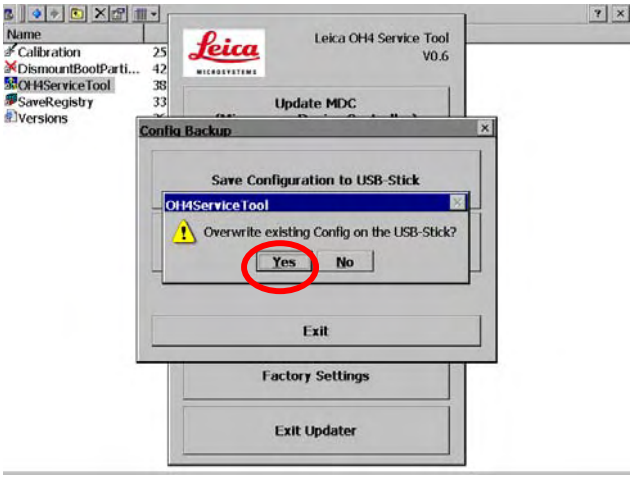
☞ We recommend to save configuration before updating, repairing or exchanging the control unit.



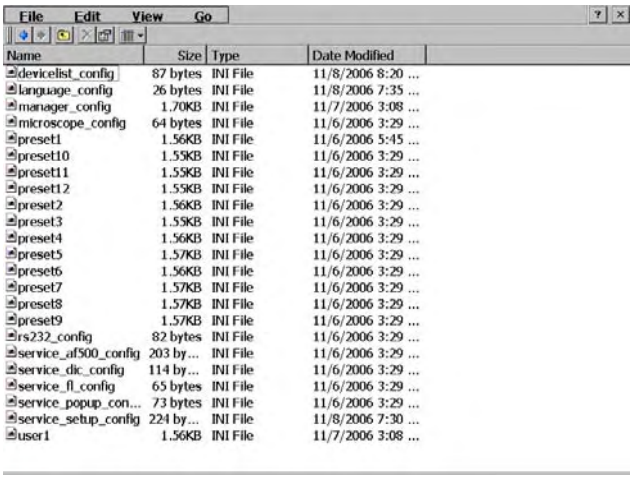
Make sure that an USB stick is plugged in (see chapter 3.35 on page 3-25).

Press “Save Configuration to USB-Stick”/ “Restore Configuration to USB-Stick”.

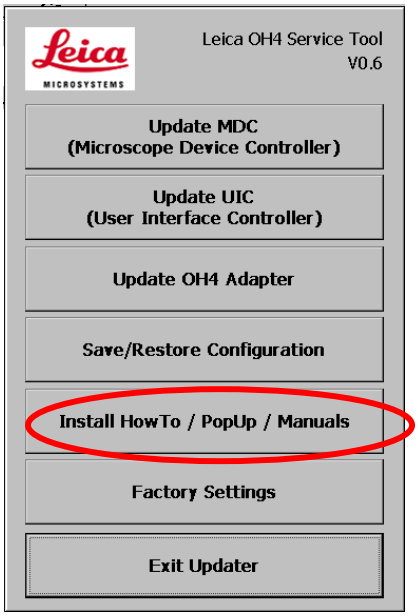




Confirm with “Yes”.


File Edit View Go
Name Size Type Date Modified
devicelist_config 87 bytes INI File 11/8/2006 8:20 ...
language_config 26 bytes INI File 11/8/2006 7:35 ...
manager_config 1.70KB INI File 11/7/2006 3:08 ...
microscope_config 64 bytes INI File 11/6/2006 3:29 ...
preset1 1.56KB INI File 11/6/2006 5:45 ...
preset10 1.55KB INI File 11/6/2006 3:29 ...
preset11 1.55KB INI File 11/6/2006 3:29 ...
preset12 1.55KB INI File 11/6/2006 3:29 ...
preset2 1.56KB INI File 11/6/2006 3:29 ...
preset3 1.55KB INI File 11/6/2006 3:29 ...
preset4 1.56KB INI File 11/6/2006 3:29 ...
preset5 1.57KB INI File 11/6/2006 3:29 ...
preset6 1.56KB INI File 11/6/2006 3:29 ...
preset7 1.57KB INI File 11/6/2006 3:29 ...
preset8 1.57KB INI File 11/6/2006 3:29 ...
preset9 1.57KB INI File 11/6/2006 3:29 ...
rs232_config 82 bytes INI File 11/6/2006 3:29 ...
service_af500_config 203 by... INI File 11/6/2006 3:29 ...
service_dic_config 114 by... INI File 11/6/2006 3:29 ...
service_fl_config 65 bytes INI File 11/6/2006 3:29 ...
service_popup_con... 73 bytes INI File 11/6/2006 3:29 ...
service_setup_config 224 by... INI File 11/8/2006 7:30 ...
user1 1.56KB INI File 11/7/2006 3:08 ...

The following files including up to 30 user settings (user1.ini to user30.ini) will be created in the folder “OH4SavedConfig” .

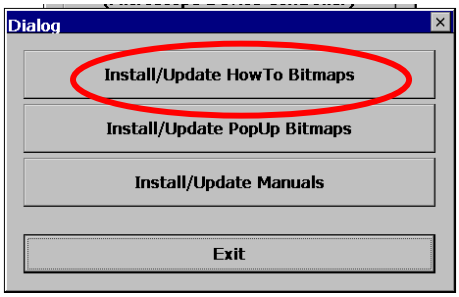


Install/Update HowTo Bitmaps

☞ Make sure that an USB stick is plugged in (see chapter 3.35 on page 3-25).

Press “Install HowTo / PopUp / Manuals”.

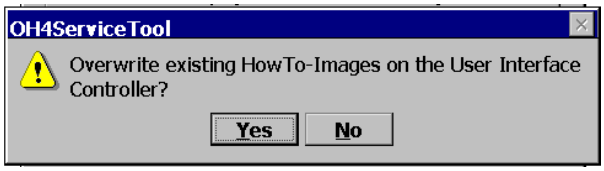
☞ Always the complete set of HowTo Bitmaps, PopUp Bitmaps or Manuals will be replaced.



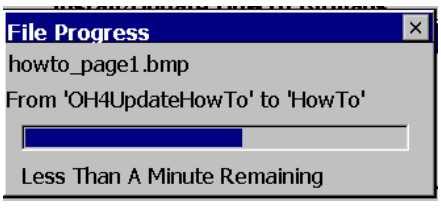
Install/Update HowTo Bitmaps

☞ Make sure that the folder “OH4UpdateHowTo” is existing on the USB stick.

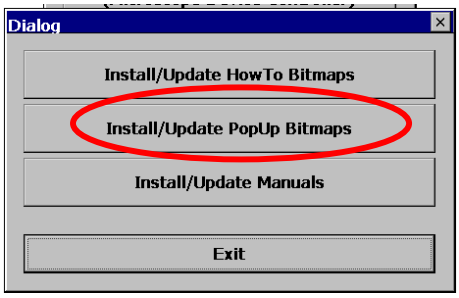
Click on “Install / Update HowTo Bitmaps”.



Confirm with “yes’.



Progress bar gives you information about the progress of updating process.

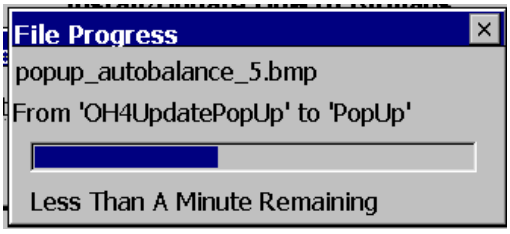


Install/Update PopUps

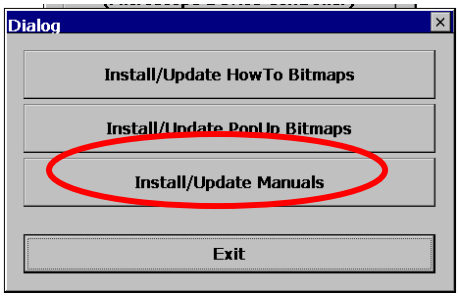
☞Make sure that the folder "OH4UpdatePopUp" is on the USB stick.

Click on "Install / Update Manuals".

Confirm with "yes'.



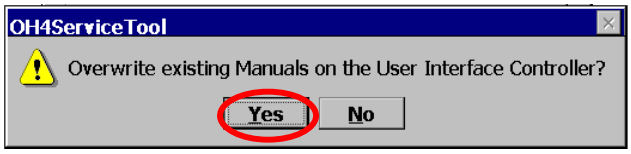
Progress bar gives you information about the progress of updating process.



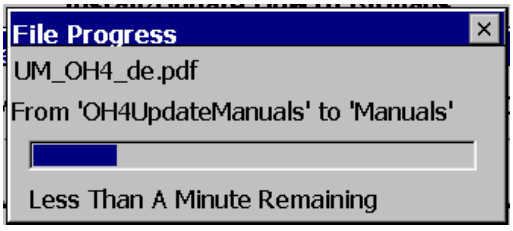
Install/Update Manuals

☞Make sure that the folder "OH4UpdateManuals" is existing on the USB stick.

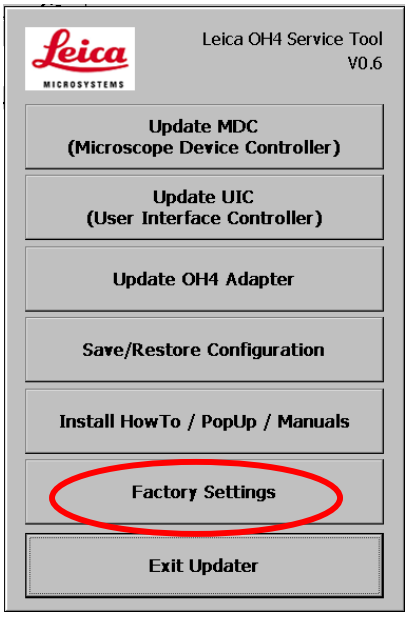
Click on "Install / Update PopUp Bitmaps".



Confirm with "yes'.



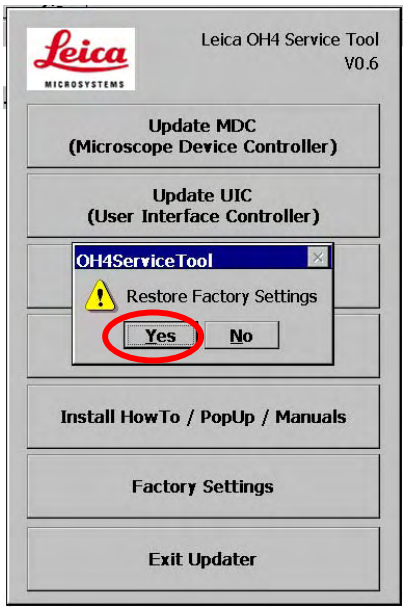
Progress bar gives you information about the progress of updating process.



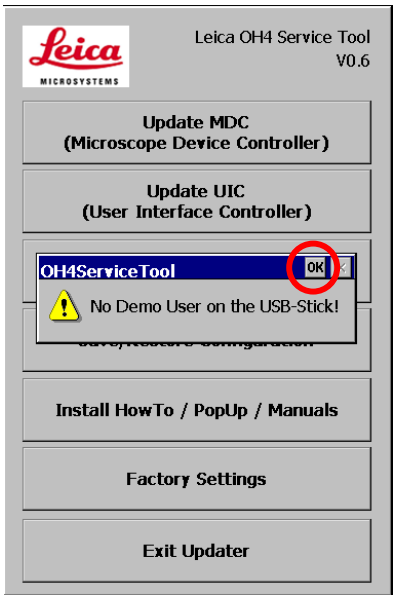
Factory Settings

Press “Factory Settings” to start reset to factory settings process.

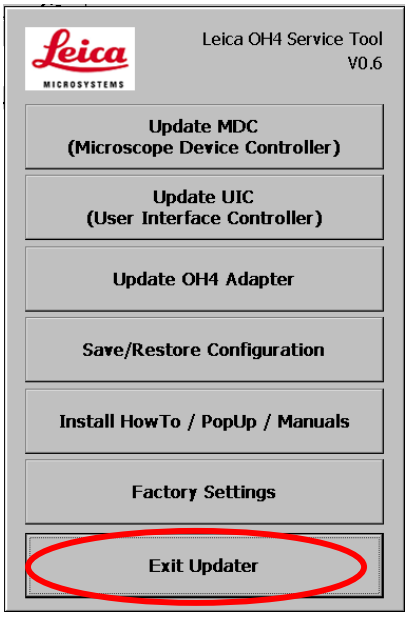
☞For a proper termination of SW updates you MUST perform this procedure!



Confirm with “Yes” to restore factory settings….



Press “OK” to continue… (There are no Demo Users available for OH4)



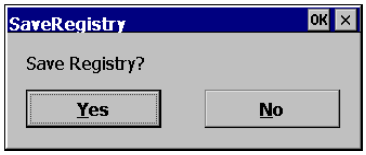
Exit Updater

Click on “Exit Updater” to exit the Leica OH4 Service tool.

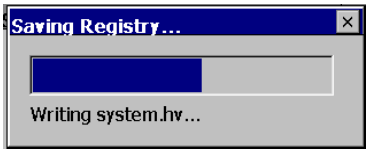
☞ Always proceed with “Save Registry” to save all changes permanently in the operating system.

Save Registry

To save your changes permanently in the operating system double click on the “Save Registry” icon.



Confirm with “yes” to save registry on hard disk.



Wait for registry data to be saved.

Switch off the Leica OH4 and restart again to go back to microscope control unit mode.

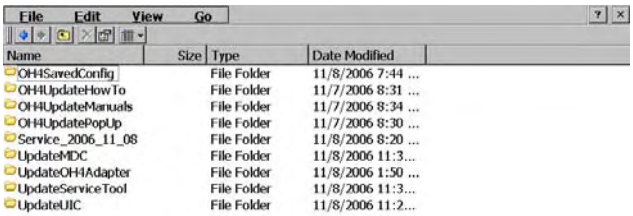
3.3.5 USB Stick

Prepare a USB stick

Do not use USB stick in a MAC computer. If so please format before use with the OH4.

Before you use an USB stick with the Leica M525 OH4 you have to prepare the following steps:

Format memory stick in FAT or FAT32 format.


File Edit View Go
Name Size Type Date Modified
OH4SavedConfig File Folder 11/8/2006 7:44 ...
OH4UpdateHowTo File Folder 11/7/2006 8:31 ...
OH4UpdateManuals File Folder 11/7/2006 8:34 ...
OH4UpdatePopUp File Folder 11/7/2006 8:30 ...
Service_2006_11_08 File Folder 11/8/2006 8:20 ...
UpdateMDC File Folder 11/8/2006 11:3...
UpdateOH4Adapter File Folder 11/8/2006 1:50 ...
UpdateServiceTool File Folder 11/8/2006 11:3...
UpdateUIC File Folder 11/8/2006 11:2...

Create the following folders on your USB stick:

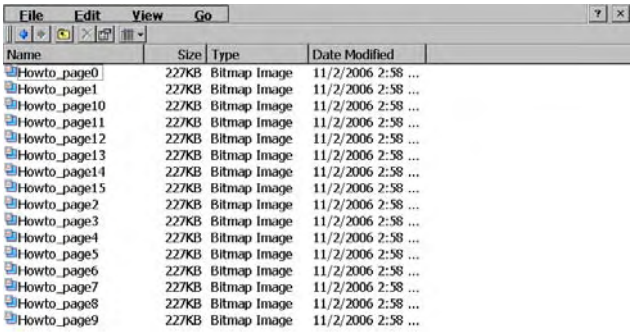
\OH4UpdateHowTo
\OH4UpdateManuals
\OH4UpdatePopUp
\OH4SavedConfig
\OH4DemoUser

and copy all necessary files to these folders (see description below).

☞You can also download the complete directory with all folders and files from the Service Net.

or

☞Order the latest version of software pack for OH4 from Leica (order No. 10714583)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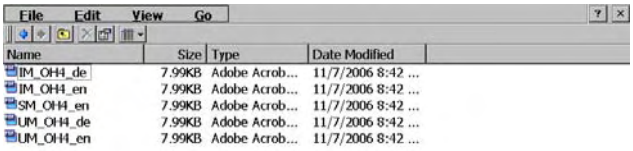
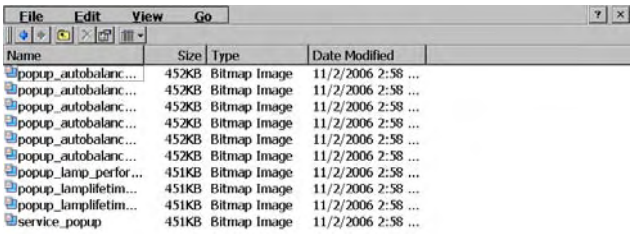
Howto_page0 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page1 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page10 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page11 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page12 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page13 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page14 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page15 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page2 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page3 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page4 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page5 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page6 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page7 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page8 227KB Bitmap Image 11/2/2006 2:58 ...
Howto_page9 227KB Bitmap Image 11/2/2006 2:58 ...

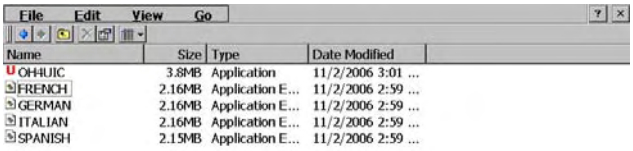
Content of the folder “OH4UpdateHowTo”


File Edit View Go
Name Size Type Date Modified
IM_OH4_de 7.99KB Adobe Acrob... 11/7/2006 8:42 ...
IM_OH4_en 7.99KB Adobe Acrob... 11/7/2006 8:42 ...
SM_OH4_en 7.99KB Adobe Acrob... 11/7/2006 8:42 ...
UM_OH4_de 7.99KB Adobe Acrob... 11/7/2006 8:42 ...
UM_OH4_en 7.99KB Adobe Acrob... 11/7/2006 8:42 ...

Content of the folder “OH4UpdateManuals”


File Edit View Go
Name Size Type Date Modified
popup_autobalanc... 452KB Bitmap Image 11/2/2006 2:58 ...
popup_autobalanc... 452KB Bitmap Image 11/2/2006 2:58 ...
popup_autobalanc... 452KB Bitmap Image 11/2/2006 2:58 ...
popup_autobalanc... 452KB Bitmap Image 11/2/2006 2:58 ...
popup_autobalanc... 452KB Bitmap Image 11/2/2006 2:58 ...
popup_autobalanc... 452KB Bitmap Image 11/2/2006 2:58 ...
popup_lamp_perfor... 451KB Bitmap Image 11/2/2006 2:58 ...
popup_lamplifetim... 451KB Bitmap Image 11/2/2006 2:58 ...
popup_lamplifetim... 451KB Bitmap Image 11/2/2006 2:58 ...
service_popup 451KB Bitmap Image 11/2/2006 2:58 ...

Content of the folder “OH4UpdatePopUp”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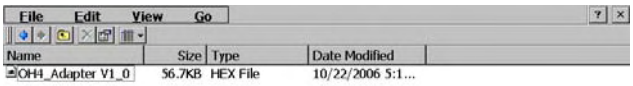
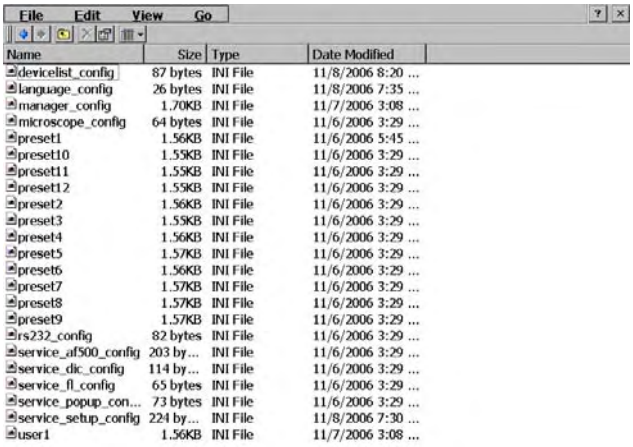
Name Size Type Date Modified
OHUIC 3.8MB Application 11/2/2006 3:01 ...
FRENCH 2.16MB Application E... 11/2/2006 2:59 ...
GERMAN 2.16MB Application E... 11/2/2006 2:59 ...
ITALIAN 2.16MB Application E... 11/2/2006 2:59 ...
SPANISH 2.15MB Application E... 11/2/2006 2:59 ...

Content of the folder “UpdateUIC” (or in root directory)



Content of the folder “UpdateOH4Adapter”

Content of the folder “UpdateMDC”


File Edit View Go
Name Size Type Date Modified
devicelist_config 87 bytes INI File 11/8/2006 8:20 ...
language_config 26 bytes INI File 11/8/2006 7:35 ...
manager_config 1.70KB INI File 11/7/2006 3:08 ...
microscope_config 64 bytes INI File 11/6/2006 3:29 ...
preset1 1.56KB INI File 11/6/2006 5:45 ...
preset10 1.55KB INI File 11/6/2006 3:29 ...
preset11 1.55KB INI File 11/6/2006 3:29 ...
preset12 1.55KB INI File 11/6/2006 3:29 ...
preset2 1.56KB INI File 11/6/2006 3:29 ...
preset3 1.55KB INI File 11/6/2006 3:29 ...
preset4 1.56KB INI File 11/6/2006 3:29 ...
preset5 1.57KB INI File 11/6/2006 3:29 ...
preset6 1.56KB INI File 11/6/2006 3:29 ...
preset7 1.57KB INI File 11/6/2006 3:29 ...
preset8 1.57KB INI File 11/6/2006 3:29 ...
preset9 1.57KB INI File 11/6/2006 3:29 ...
rs232_config 82 bytes INI File 11/6/2006 3:29 ...
service_af500_config 203 by... INI File 11/6/2006 3:29 ...
service_dic_config 114 by... INI File 11/6/2006 3:29 ...
service_fl_config 65 bytes INI File 11/6/2006 3:29 ...
service_popup_con... 73 bytes INI File 11/6/2006 3:29 ...
service_setup_config 224 by... INI File 11/8/2006 7:30 ...
user1 1.56KB INI File 11/7/2006 3:08 ...

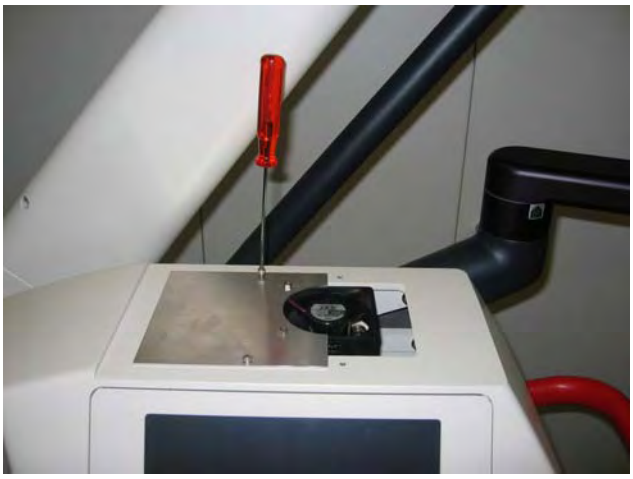
Content of the folder “SavedConfig”

-> create an empty folder with the name “SavedConfig” . Files will be written to this folder when you are saving the configuration.

Connect the USB stick

Switch off the Leica M525 OH4 and

unscrew to remove the cover…



Unscrew and remove fan holder plate. Unplug fan.

Plug in the USB stick into any of the two USB connectors.

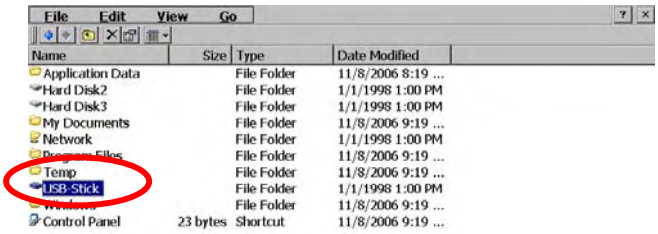
Switch on again the Leica M525 OH4

☞ The USB stick will be recognized by the system. You will find the “Download” button on all “Diagnose” pages.

3.3.6 Update the Service Tool

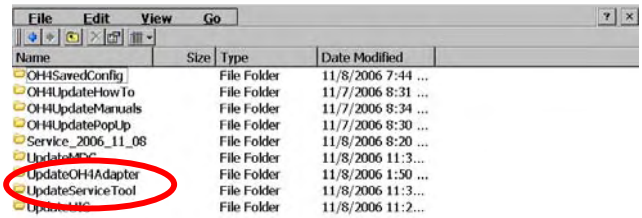
Click with a touchpen to the lower left corner of the touch panel to open the start menu.

Click on “Programs” and than on “Windows Explorer” to start the windows explorer.

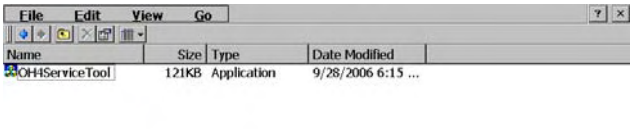

File Edit View Go
Name Size Type Date Modified
Application Data File Folder 11/8/2006 8:19 ...
Hard Disk2 File Folder 1/1/1998 1:00 PM
Hard Disk3 File Folder 1/1/1998 1:00 PM
My Documents File Folder 11/8/2006 9:19 ...
Network File Folder 1/1/1998 1:00 PM
Temp File Folder 11/8/2006 9:19 ...
USB-Stick File Folder 1/1/1998 1:00 PM
Control Panel 23 bytes Shortcut 11/8/2006 9:19 ...

Double click on your “USB Stick”.

You will see the content of your USB stick.


File Edit View Go
Name Size Type Date Modified
OHISavedConfig File Folder 11/8/2006 7:44 ...
OHIUpdateHowTo File Folder 11/7/2006 8:31 ...
OHIUpdateManuals File Folder 11/7/2006 8:34 ...
OHIUpdatePopUp File Folder 11/7/2006 8:30 ...
Service_2006_11_08 File Folder 11/8/2006 8:20 ...
UpdateOHIAdapter File Folder 11/8/2006 1:50 ...
UpdateServiceTool File Folder 11/8/2006 11:3...

Open the folder “UpdateServiceTool” by double clicking.



Double click on the batch file “Update Service Tool”. Update process will start.

After finishing updating process you come back to explorer window.

5. Replacing modules/adjusting procedures

Table of content

Chapter Page

D-balance adjustment 5-1
A/B-balance adjustment 5-9
Check/adjust C-arm backlash 5-21
Adjust C-arm backlash with shim set 5-23

5 Replacing modules/adjustment procedures

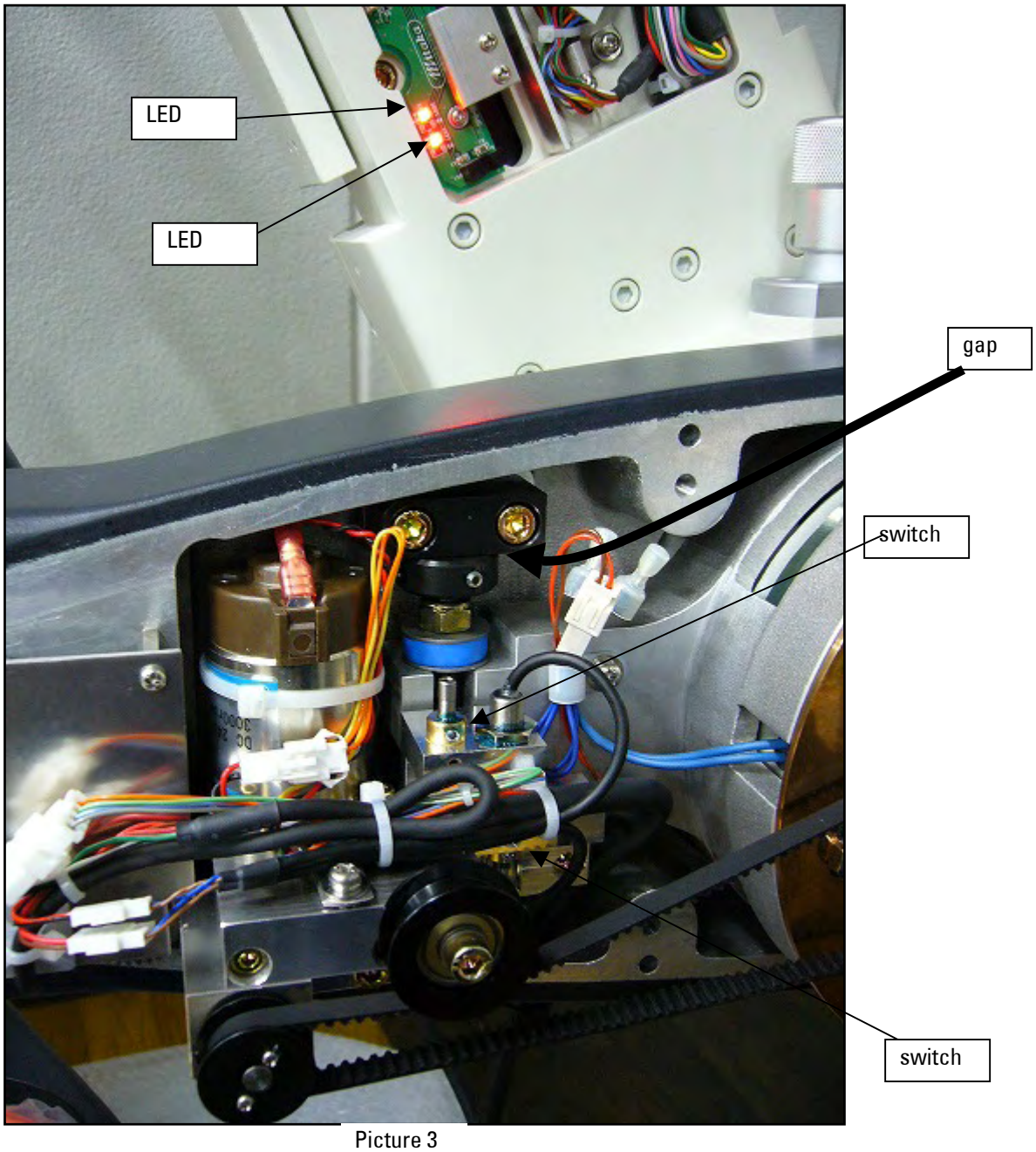
D-balance module (Mitaka procedure)

1. Turn on the main power and adjust balance correctly by using manual switch.

2. Remove 2 covers, please make switch and switch LED visible (refer to picture 1, 2 & 3).

Picture1

Picture2



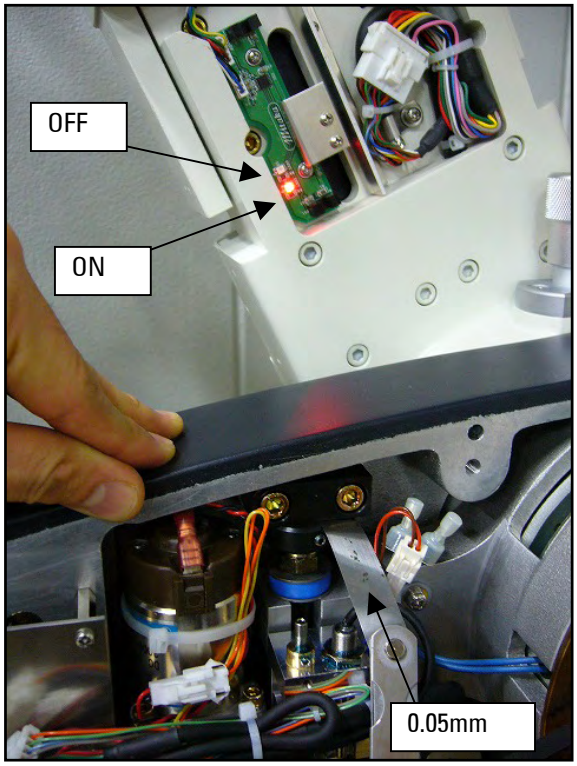
Picture 3

3. If the D-axis is moved up and down by the hand, confirm the LEDs blink in order.

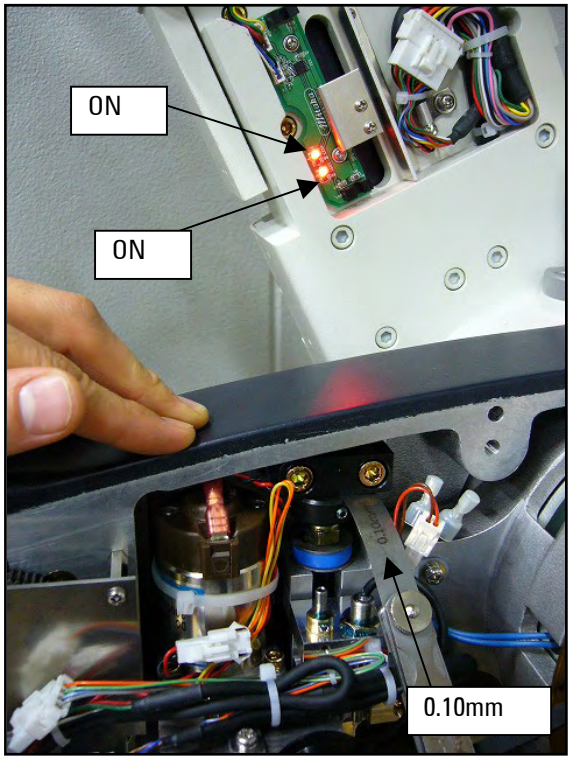
4. If LED has blinked quickly in order, it is no problem for the balance switch.

5. Otherwise, it is necessary to adjust the switch. Advance to No. 6

6. Insert shim of 0.05mm in the gap, and push down the D-axis by hand. Only one LED lights respectively if it is normal.(refer to picture4)
Insert shim of 0.10mm in the gap, and push down the D-axis by hand. Both LEDs lights respectively if it is normal. (refer to picture5)

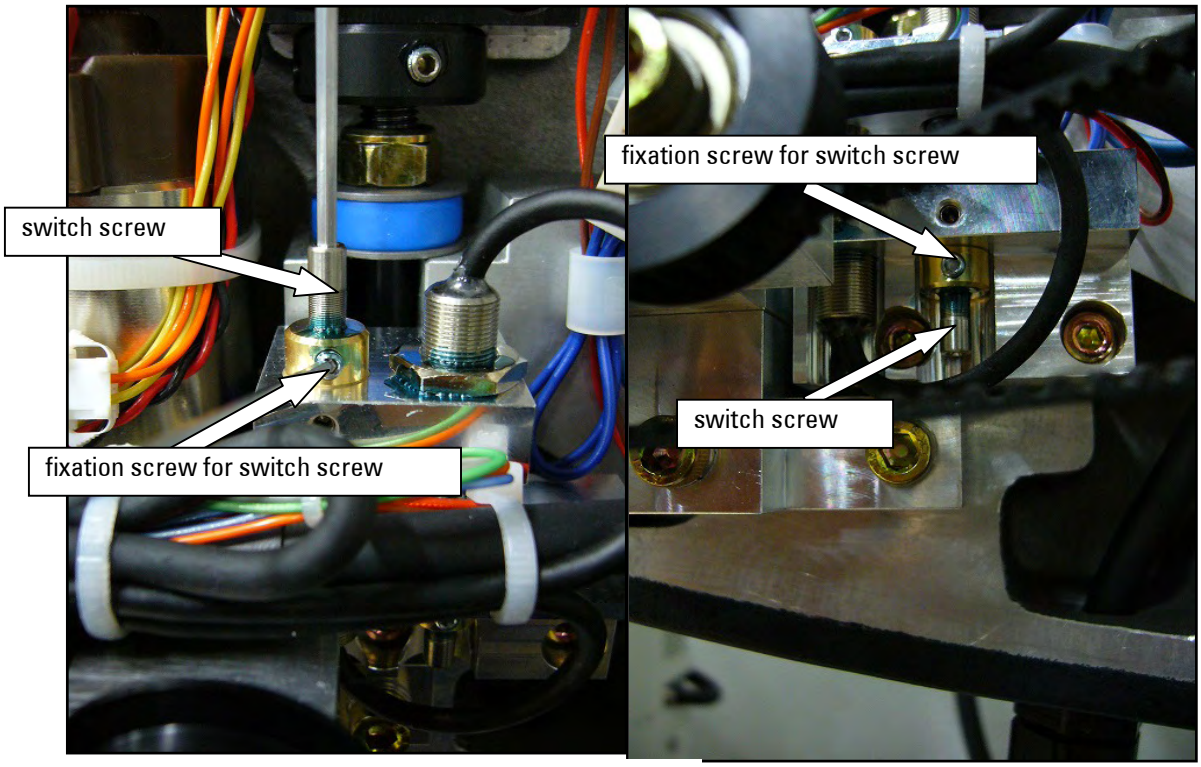


Picture 4



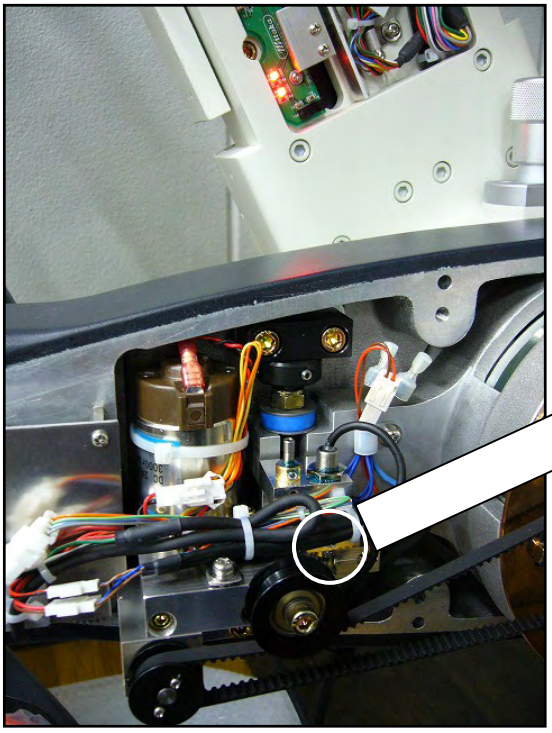
Picture 5

7． When not becoming it as shown in the picture 4, 5, “Thread locker” of the switch screw and the fixation screw for switch screw are removed by using the solvent (organic solvent etc).（refer to picture 6）

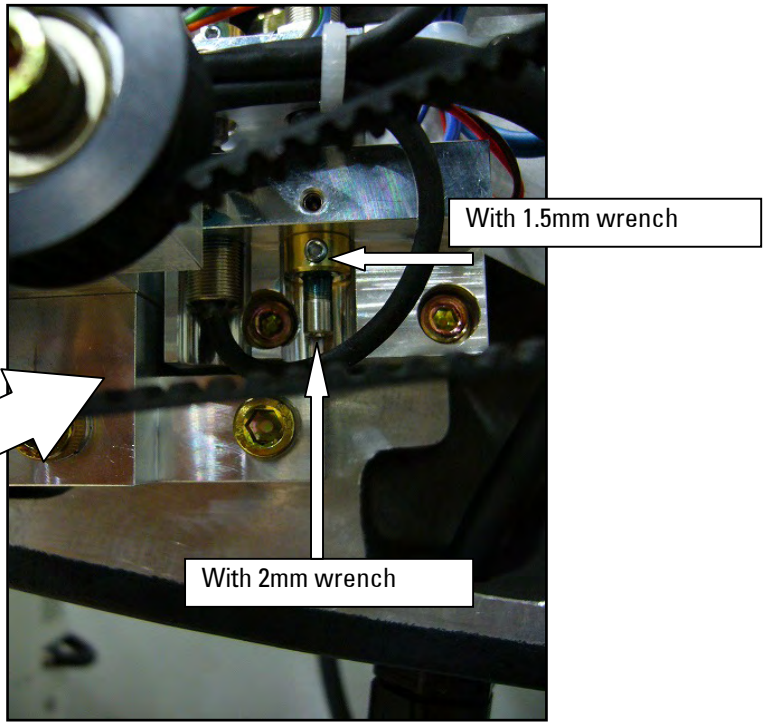


Picture 6

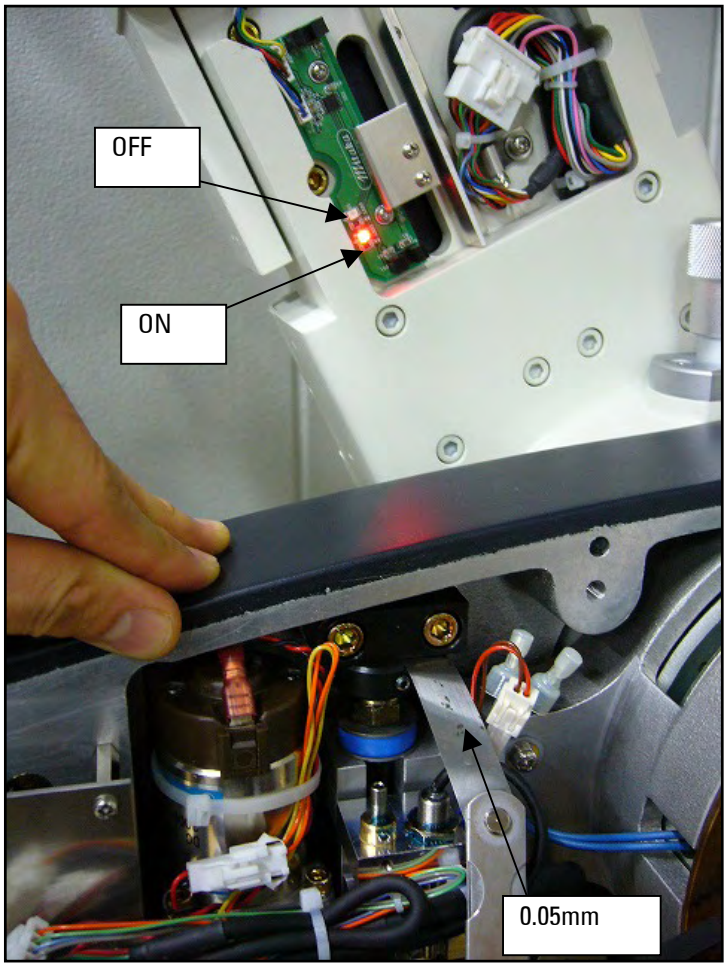
8. Perfect switch adjustment is only one LED will light if you insert the 0.05mm shim and push down the D-axis, LED will not light if you removed shim. The fixation screw for switch screw is loosened with 1.5 mm hexagonal wrench, the switch screw moves with 2mm hexagonal wrench and it adjusts, then the switch fixation screw for switch screw is tightened with 1.5mm wrench. (refer to picture 7,8,9)
(The switch reacts when 20µm moves after touching by the point. A movable stroke is 2mm).



Picture7

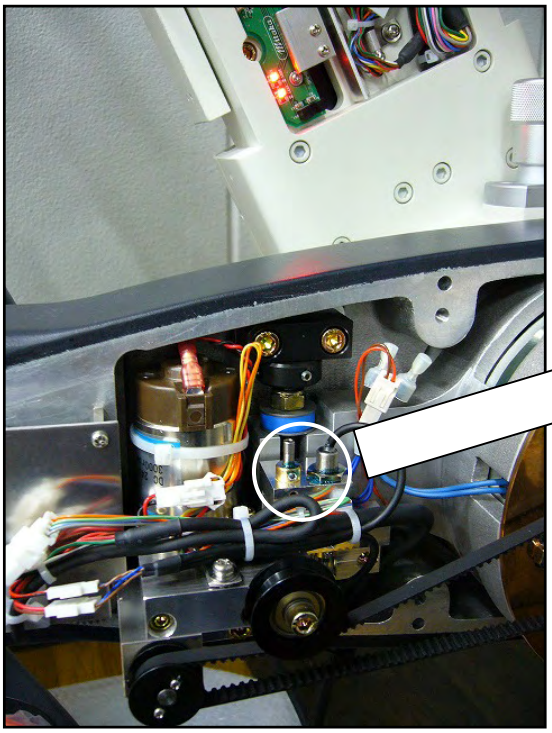


Picture 8

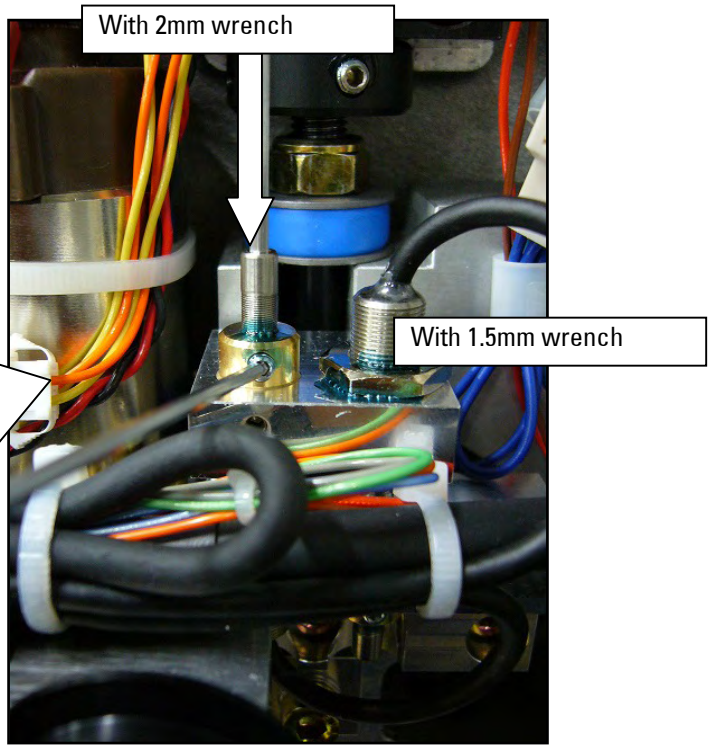


Picture9

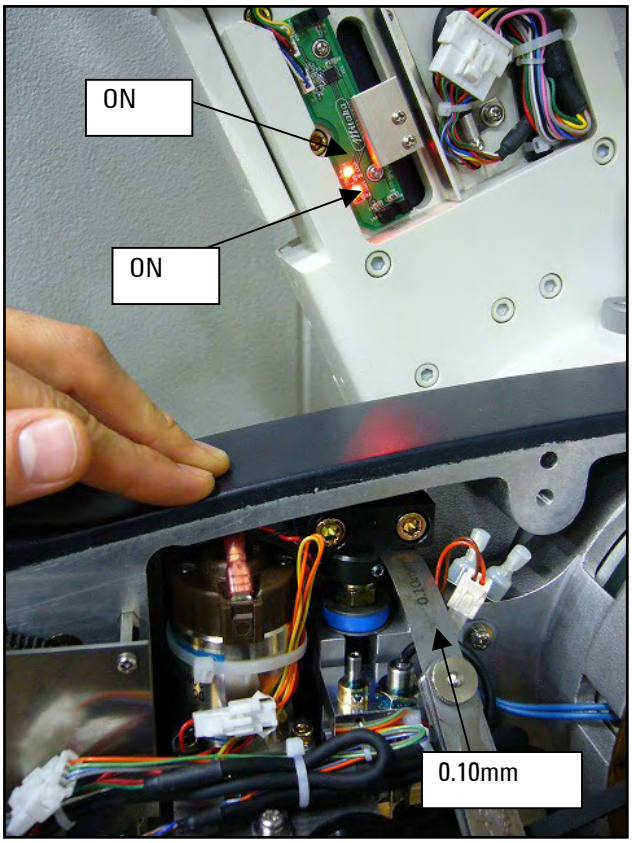
9. Implement the same adjustment with 0.10mm shim. In this case, both LEDs will light. (refer to picture 10,11,12)



Picture10



Picture11



Picture12

10. If the D-axis is moved up and down by the hand, confirm the LEDs blinks in order.

11. “Thread locker” is spread on the switch screw and the fixation screw for switch screw.

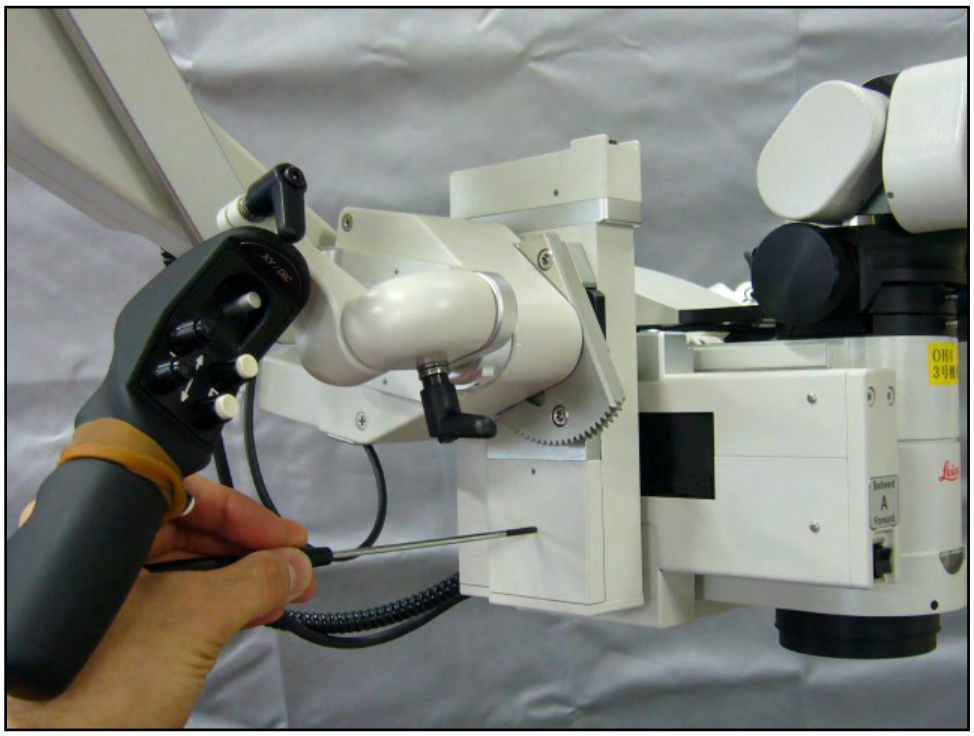
12. Each cover is tightened.

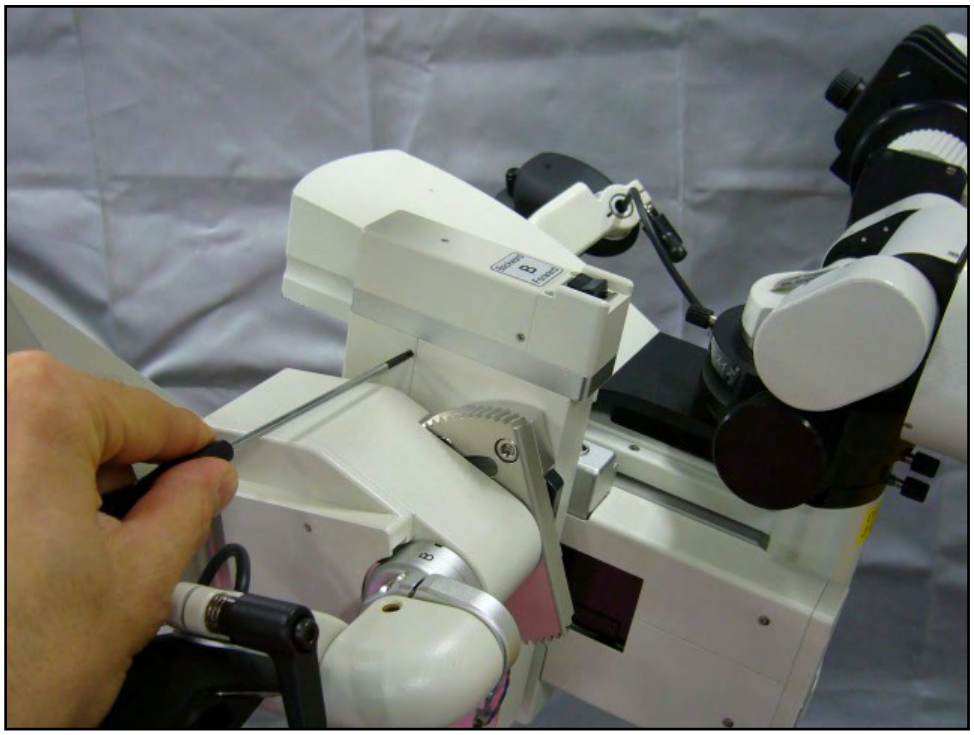
13. Confirm with auto balance mode.

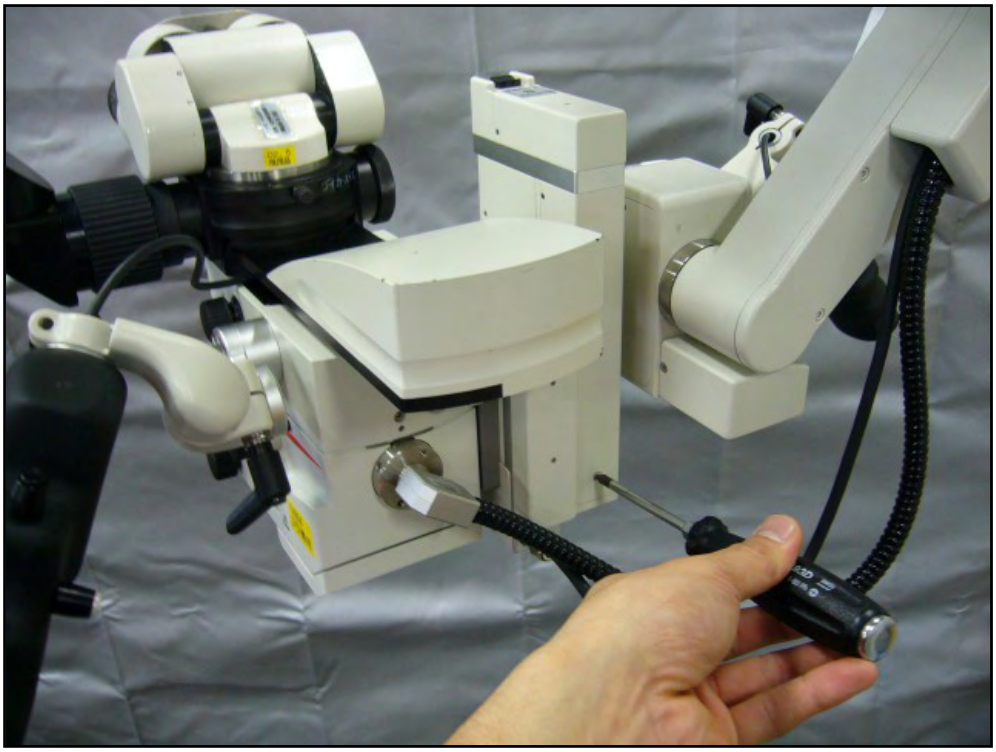
A/B-balance module (Mitaka procedure)

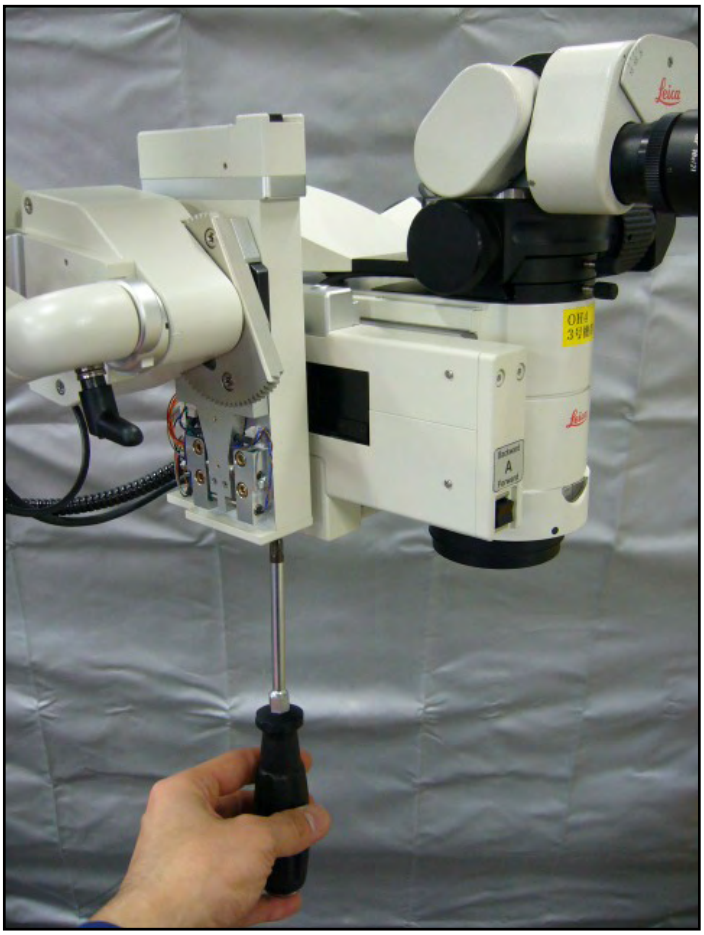
1. Turn on the main power and adjust all balance correctly by using manual switch at each axis

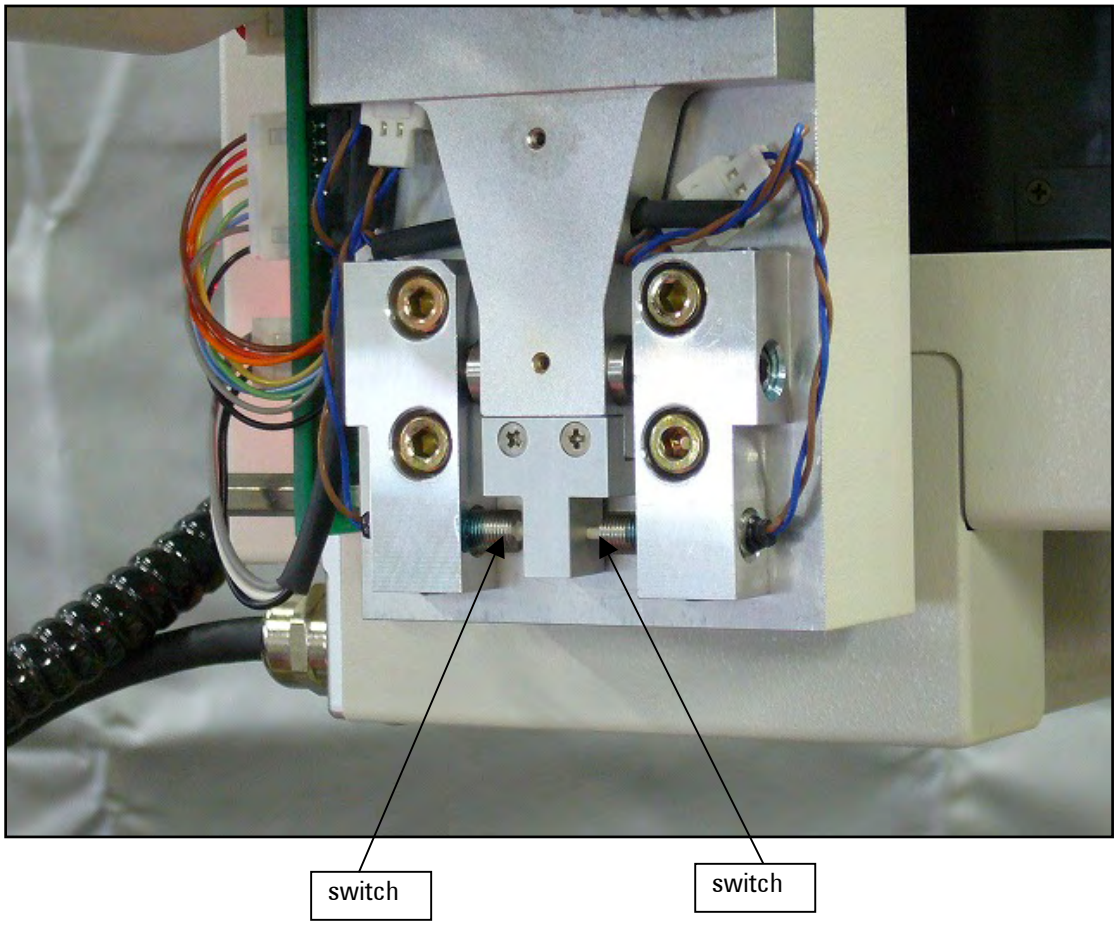
2. Remove 3 covers, please make switch and switch LED visible (refer to pictures below).

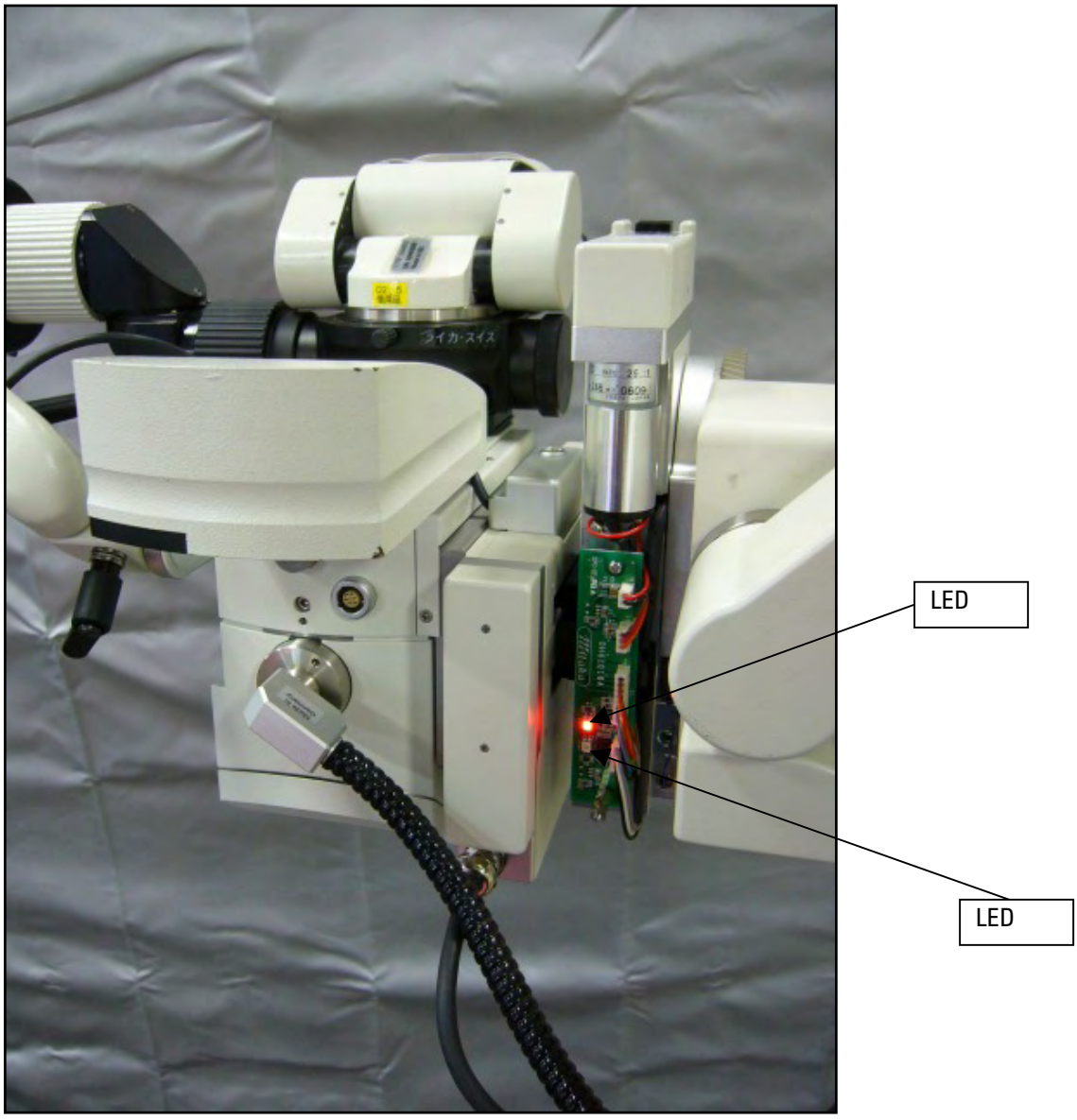




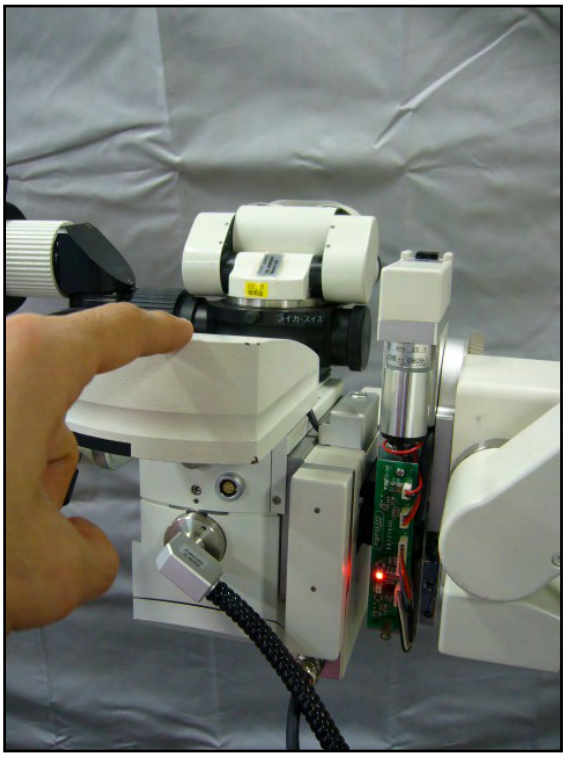


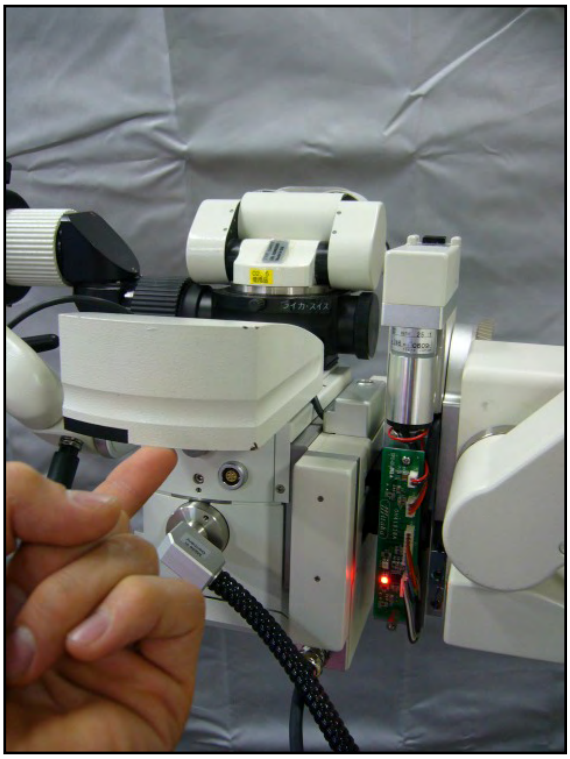

Leica
OH4
3.9
Backward
A
Forward


switch
switch


LED
LED

3. It lightly touches the microscope etc. by the finger, whether LED blinks alternately is confirmed applying by the light power (0.1N*m). (Confirm it respectively in a state both position A and B).

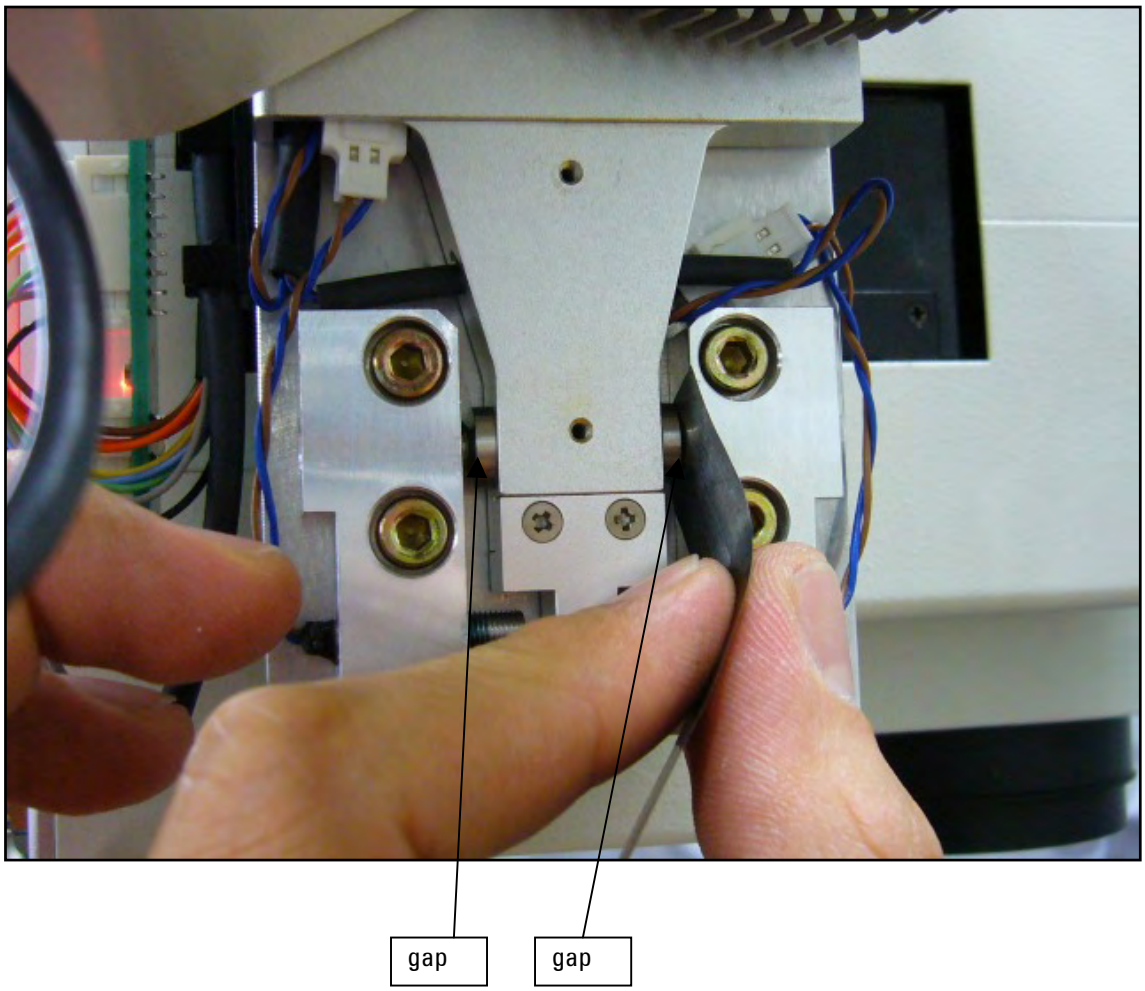


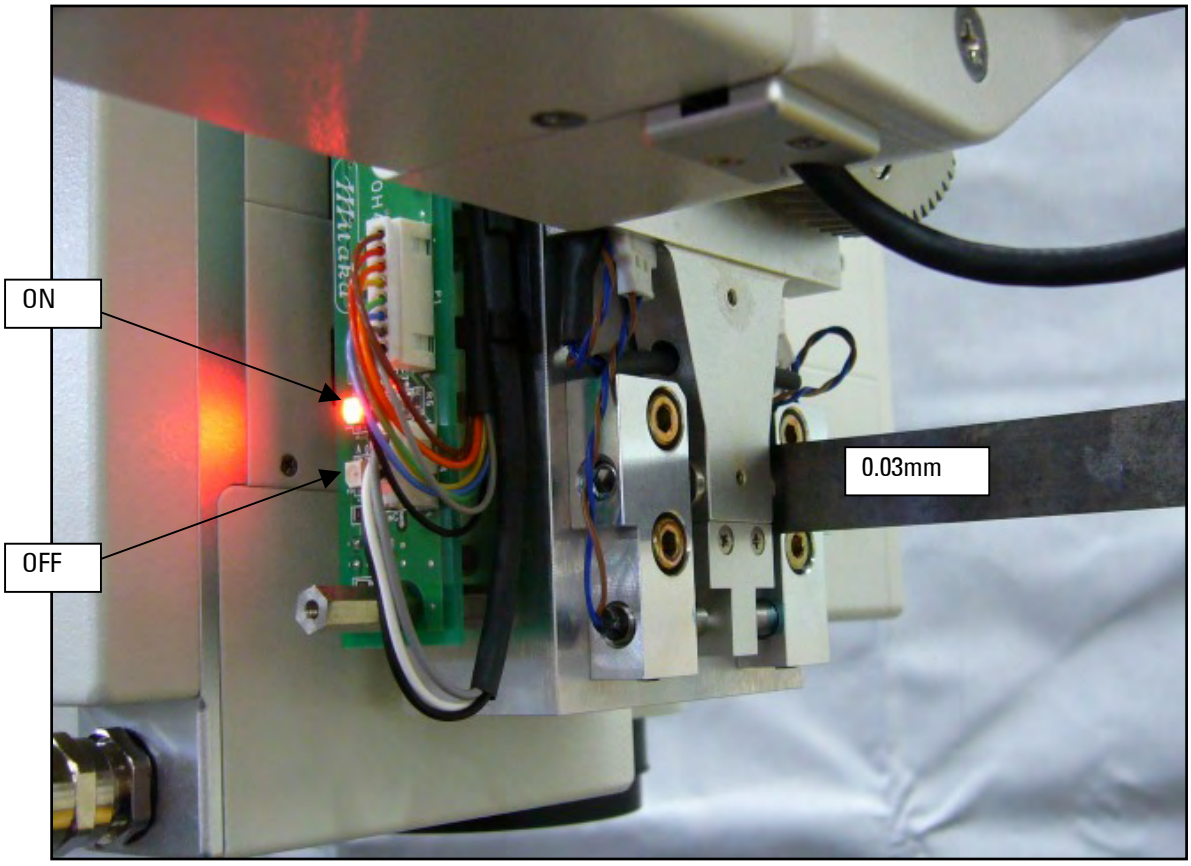


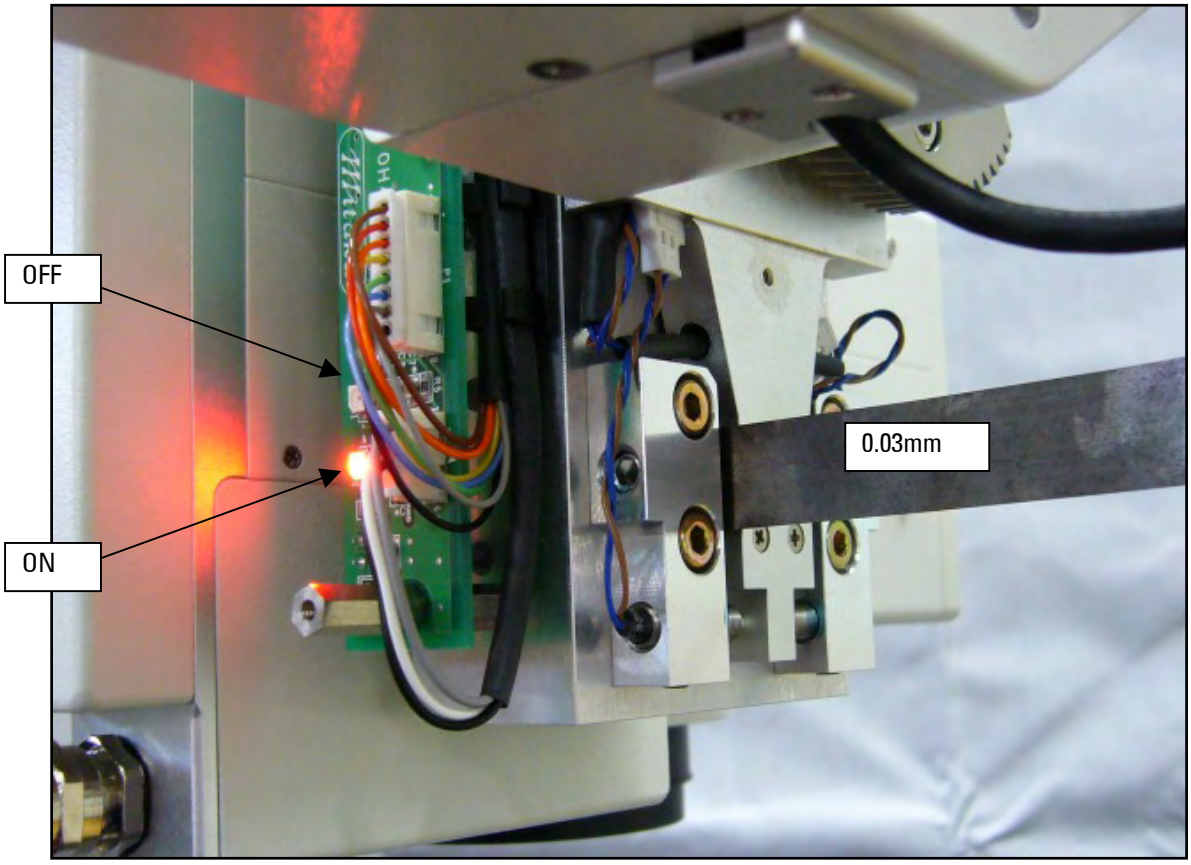
4. If LED has blinked applying light power (0.1N*m), it is no problem for the balance switch.

5. Otherwise, it is necessary to adjust the switch. Advance to No. 6.

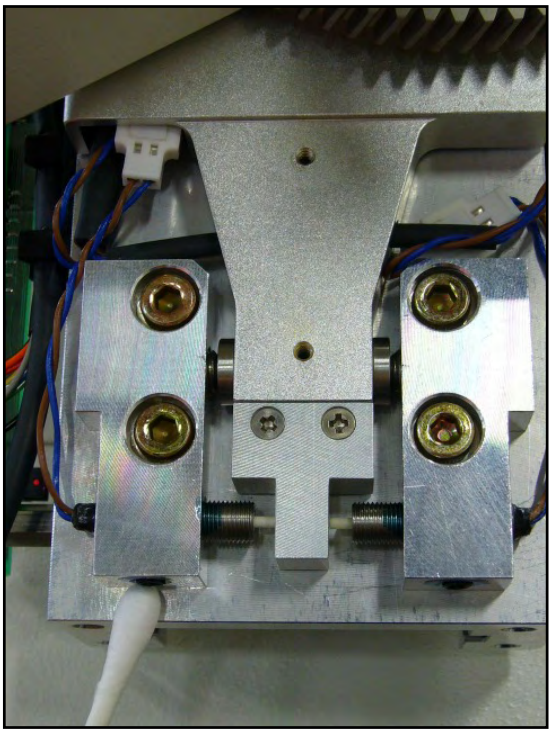
6. The part in the picture is a gap part for the switch perceives. Insert shim of 0.03mm in this gap. LED lights respectively if it is normal.

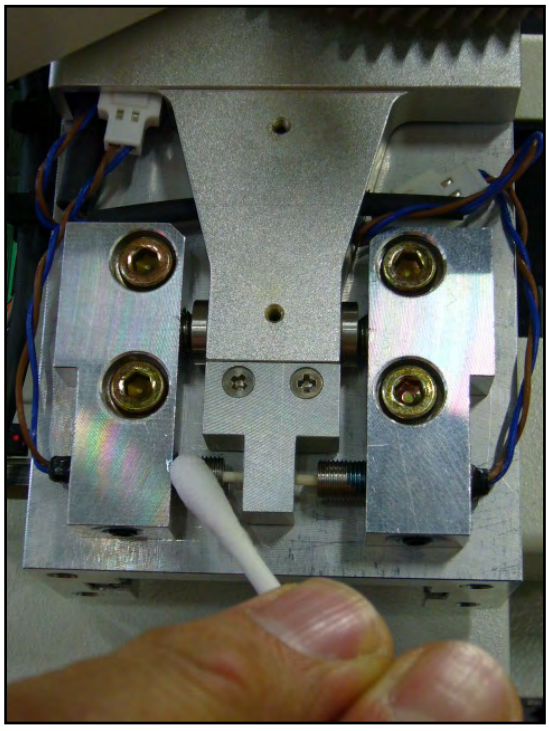



ON
OFF
0.03mm

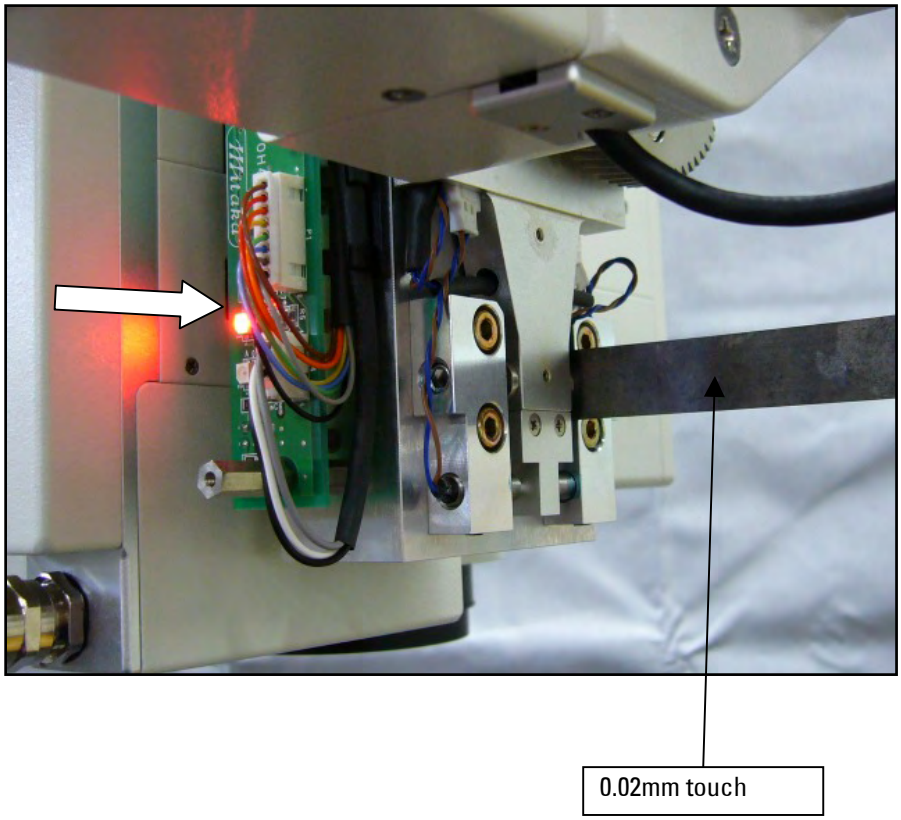

OFF
ON
0.03mm

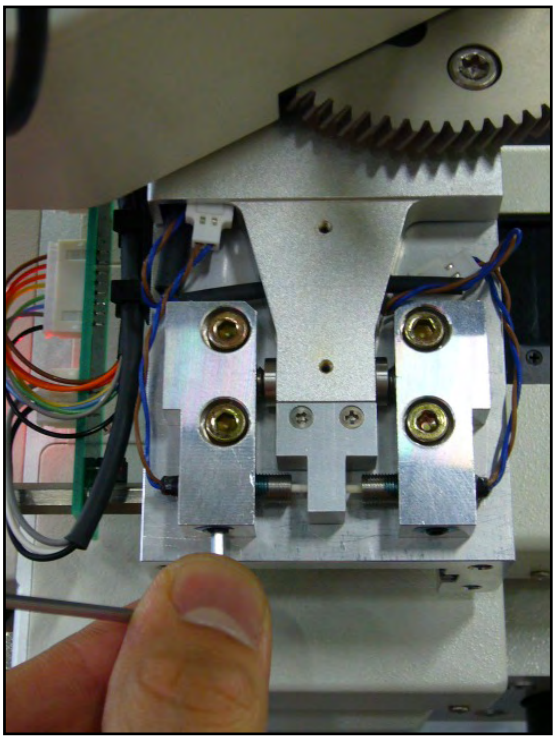
7. When not becoming it as shown in the picture of 6, “Thread locker” of the switch and the switch fixation screw are removed by using the solvent (organic solvent etc).

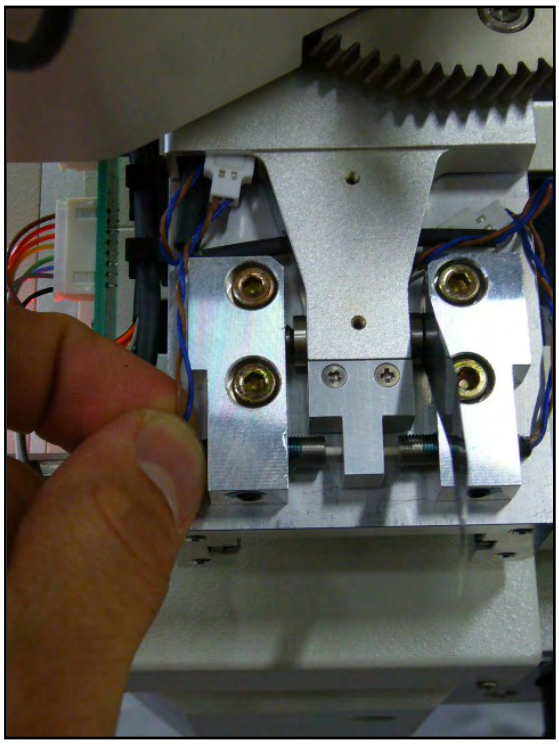




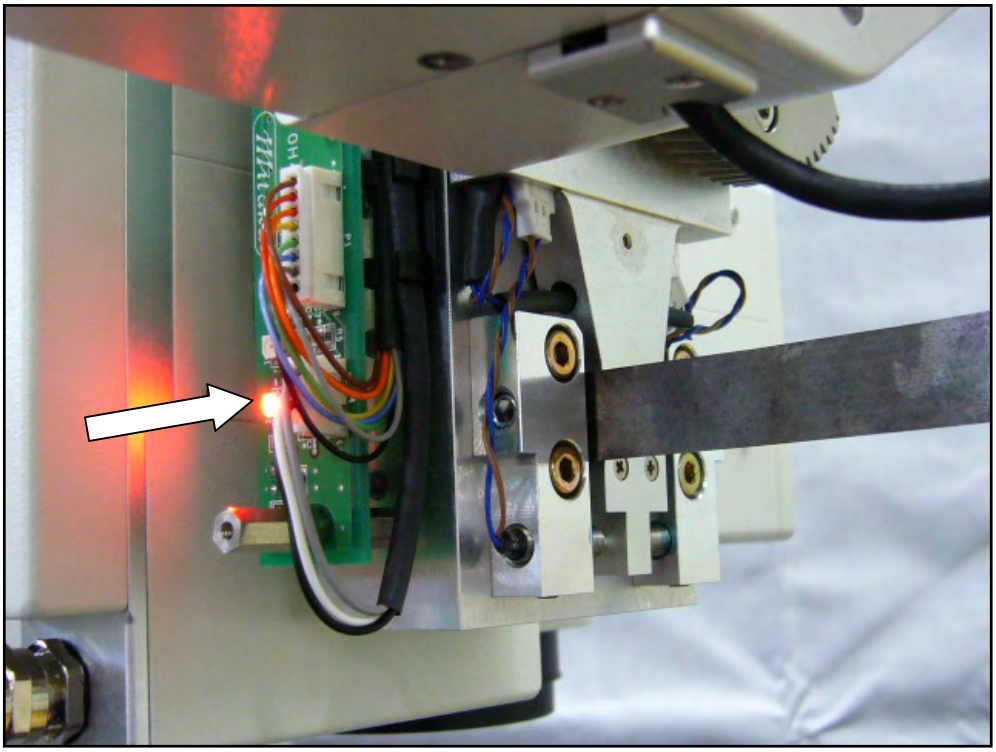
8. Perfect switch adjustment is that LED will light if you insert the shim, LED will not light if you removed shim. The switch fixation screw is loosened with 2 mm hexagonal wrench, it moves while rotating the switch and it adjusts, then the switch fixation screw is tightened
(The switch reacts when 20µm moves after touching by the point. A movable stroke is 2mm).





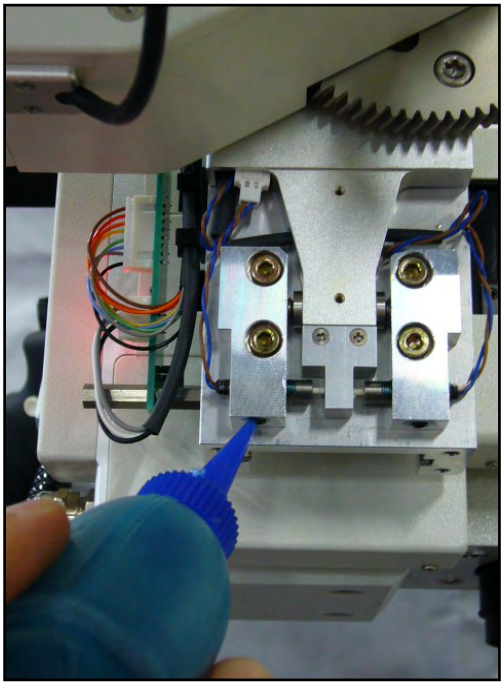


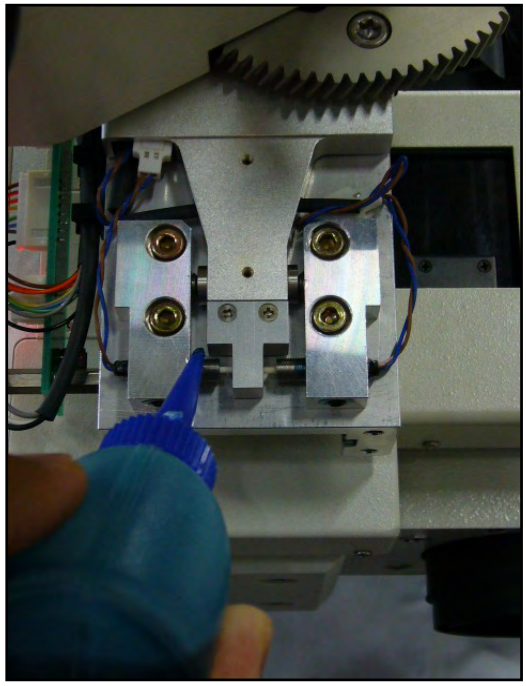
9. Implement the same adjustment for the other side.



10. Confirm whether LED is blinked at A and B position by light power.

11. “Thread locker” is spread on the switch and the switch fixation screw.





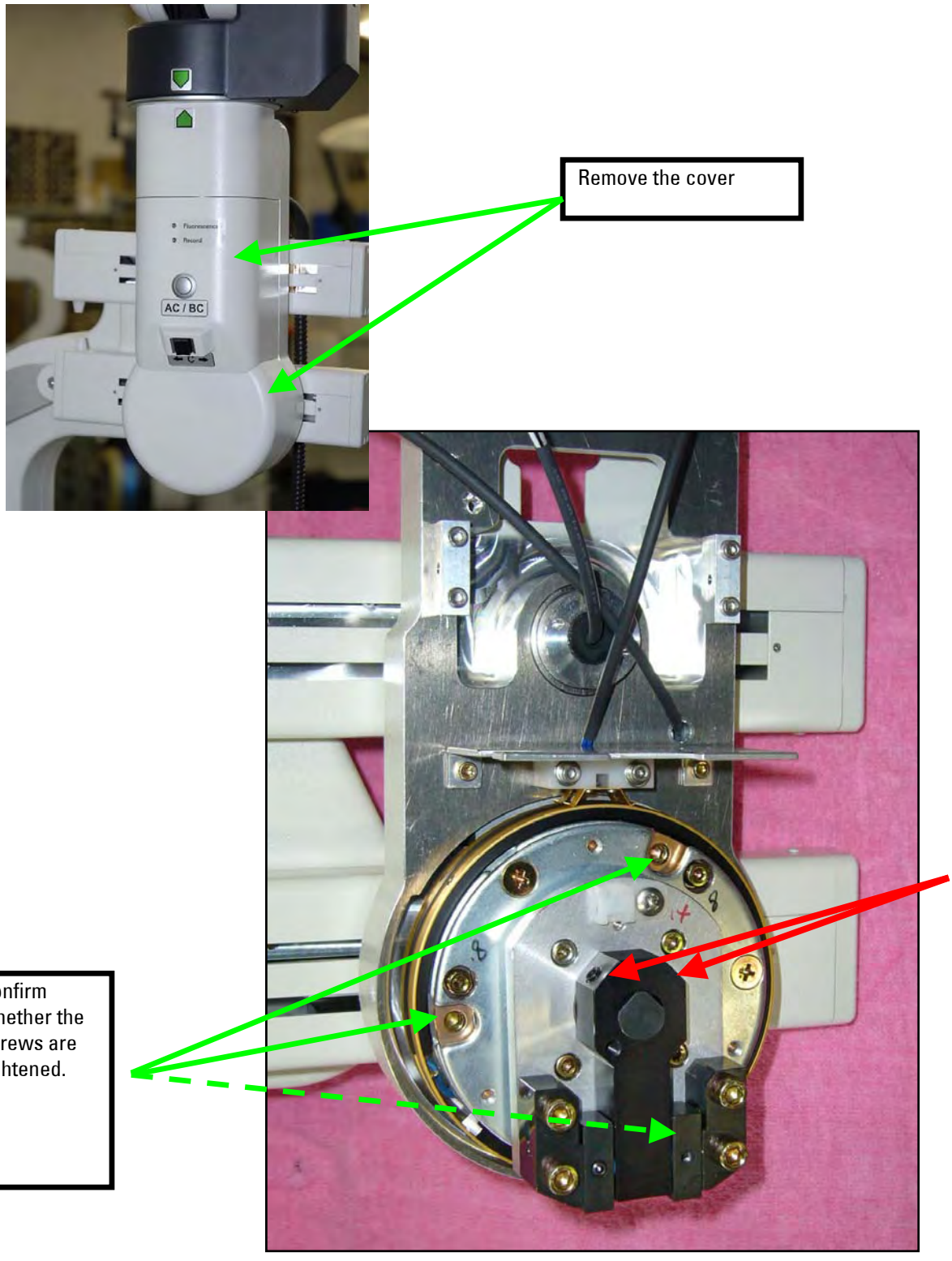
12. Each cover is tightened. (4 pcs screws in the picture are tightened equivalently)

13. Confirm with auto balance mode.

Check/adjust of C-arm backlash (Mitaka procedure)

Checking screws

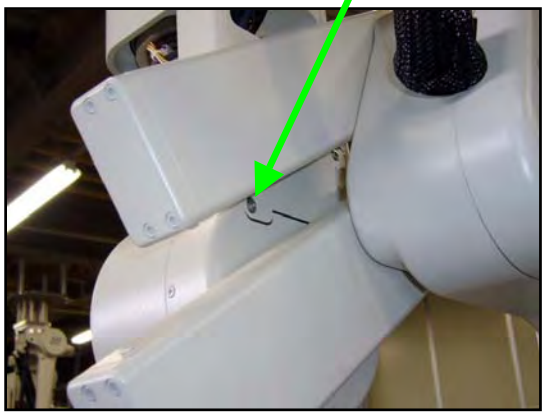
At first remove the clutch (No. 4) cover, and please confirm that a screw of an arrow of picture below tightens surely. Please perform its clamping work and confirmation of backlash after balancing of microscope.

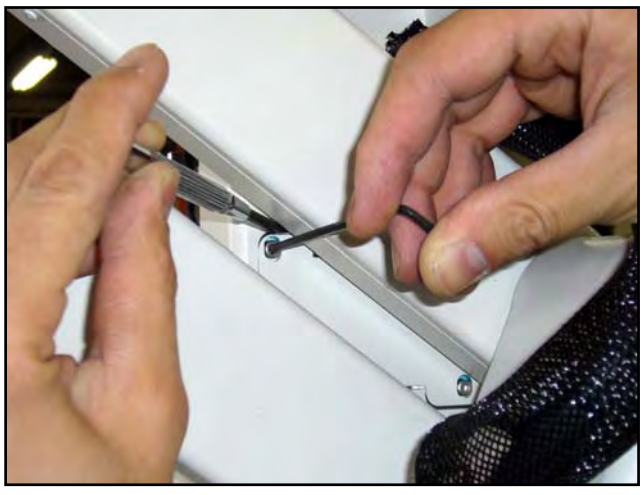


When there is still backlash, there is a possibility that engaging the worm gear loosens. Please adjust engaging according to the following instructions.
Please perform its clamping work and confirmation of backlash after balancing of microscope.

Please note that the motor might not rotate normally when the clearance of the gear is reduced more than the necessity.

These four screws are loosened by about one rotation.

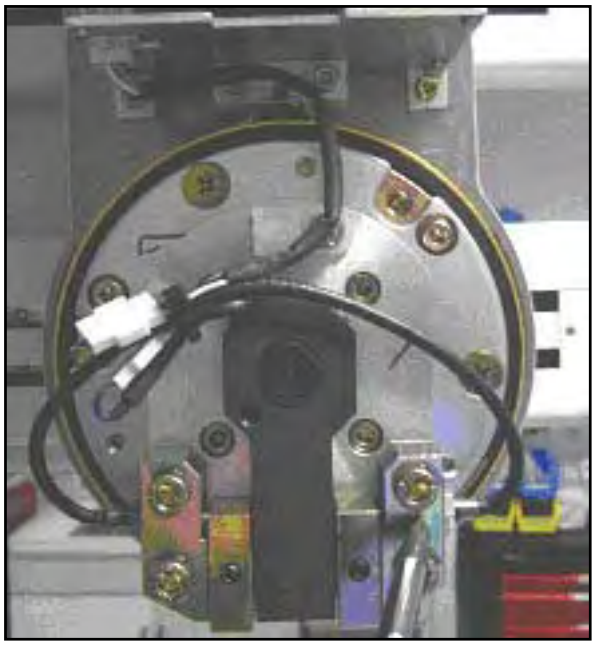




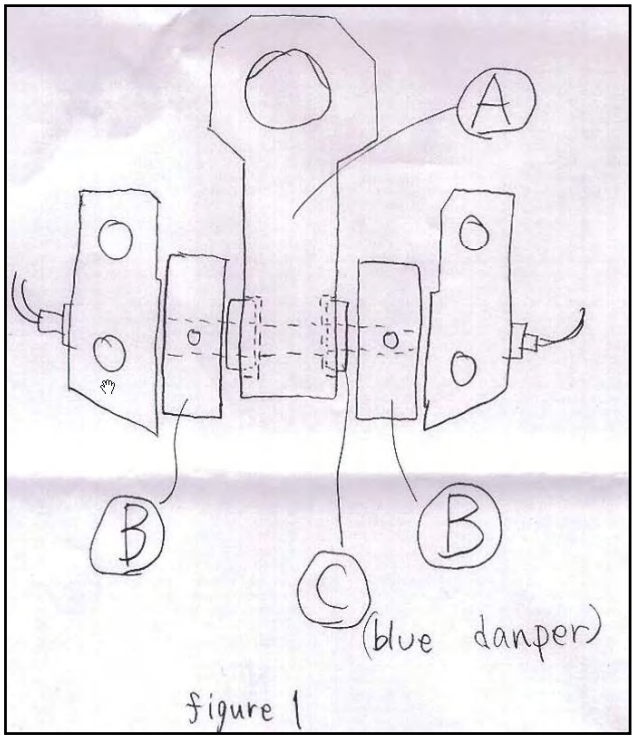
Tighten up a screw by a small minus driver and depressing moderately the board of worm.
After backlash is confirmed, the operation of the direction of Y is confirmed with the joystick. Please confirm that it operate even in the case of minimum speed.

Adjusting by shim set 10714998

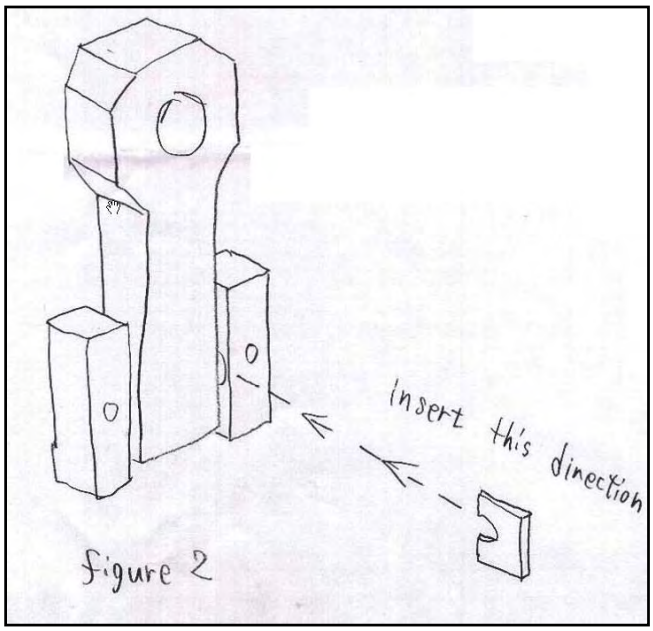
1. Turn off main power
2. Remove cover at brake 5



3. Hold both hand grips and tilt microscope either right or left. Confirm A and B move independently – refer to figure 1:



4. Apply grease (FM5 - 10289967 or similar) to both sides of the 2 spacers, then insert these between B and C until it flushes with B.



5. Turn on main power.
6. Activate auto balance function and check proper function.

6 Maintenance service - Leica OH4 stand

General guidelines maintenance

Instruments and their accessories are generally exposed to dust and dirt.

Each time, before you use them, carry out an external inspection of accessible mechanical and optical parts such as eyepieces, optics carrier, objectives, binocular tubes and accessories; clean them if necessary.

Dust and dirt have a negative effect on the results of your work.

When the instruments are not in use, use the dust covers and dust plugs provided.

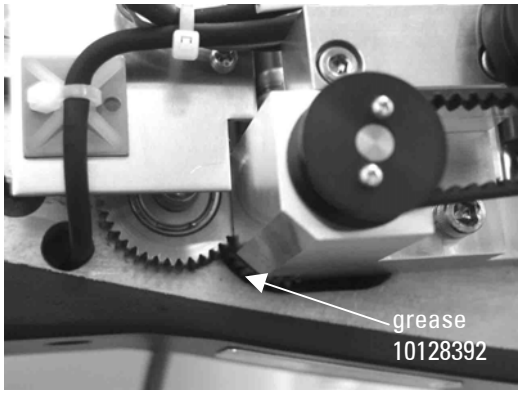
Specific guideline for the Leica OH4 stand

We recommend to do a preventive maintenance of the product every 18 month.

Check and re-grease concerning mechanical parts every 18 months.

Concerning parts are:

- Gears and spindles - use Leica grease D2m (number for 25g – 10289964)
- Slides, sliding parts - use Leica grease D2 (number for 25g – 10289966)
- Screws- use Leica grease FM5 (number for 25g – 10289967)
- Worm gear drive (D-balance) – use Leica grease (10128392 Molykote G Rapid PL)



D-balance

7. Inspection - Leica OH4 stand

Table of content

Chapter	Page
Test certificate	7-1
List of accessories and their weight	7-2
Leakage current test	7-3

Test Certificate for Leica OH4 stand

Configuration:

System	Serial no.	Software version	Remark
Stand OH4	Stand:	Stand:	
Microscope system **M525 OH4**	Optics carrier:	Optics carrier:	
Illumination	Main bulb: Operation hours: Spare bulb: Operation hours:		
Settings	**Value**		**Remark**
Main voltage set to:	o 100V o 120V o 220V o 240V		
Installed weight discs:	Light discs: Heavy discs:		

List of accessory and its weight

Attached	Accessory	Stock nbr.	Single weight	Total weight
	Eyepiece f. spect. W's 10x/21B	10446485	0.1 kg	
	Binocular tube variable 30-150°	10446797	0.8 kg	
	Binocular tube variable 0-180°incl. Eye pieces	10446573	1.4 kg	
	Inclined binocular tube, T	10446574	0.7 kg	
	Straight binocular tube, T	10446587	0.8 kg	
	Stereo attachment for 2nd observer	10446475	0.92 kg	
	Beam splitter 50/50	10446482	0.36 kg	
	Multifocal protective glass	10446058	0.017 kg	
	Zoom video adapter	10446592	0.72 kg	
	NIR Dual Video Adapter incl. objective	10713669	1.24 kg	
	UV camera handle		0.1 kg	
	Sony NIR camera	10713897	0.04 kg	
		10713667		
	Observation filter module	10713680	0.5 kg	
	Tube adapter, 30° rotatable	10445349	0.184 kg	
	Counter weight, M500	10446570	2.9 kg	
	FL illumination module incl. adapter plate	10713648	0.84 kg	
	ULT500 Ultra Observer	10446854	3.02 kg	
	DI-Color Module (DI C500)	10446852	4.14 kg	
	M680 sterile glass	10446469	0.06 kg	
*Total weight				

- Maximum weight permitted onto dovetail interface of microscope: 12 kg

Leakage Current Test related to IEC 601-1

Description	Permitted value	Actual value
Stand + main Xenon lamp	< 200 µA (220/240V)	µA
Stand + spare Xenon lamp	< 200 µA (220/240V)	µA
Stand + main Xenon lamp	< 100 µA (100/120V)	µA
Stand + spare Xenon lamp	< 100 µA (100/120V)	µA

Spare parts – OH4

Table of content

Chapter	Page
General parts	8-1
Base	8-3
Tower/Column	8-5
Light source	8-7
Control unit	8-10
D-balance module	8-13
Swing arm large	8-15
Swing carrier	8-17
Handgrip	8-21
Optics carrier M525	8-24
Cable	8-25
Tools	8-36

Stock n°	Description / Specification	Remark	Drawing

Stock n°.	Description / Specification	Remark	Drawing

Spare parts – OH4

General parts

10714718 Set of screws

contains:

1. 6 x M3x25 Cap Screws
2. 4 x M3x8 Cap Screws
3. 3 x M5x15 Cap Screws
4. 2 x M10 Hexagon Nuts
5. 1 x M14 Hexagon Nut
6. 4 x M2x5 Bind Screws
7. 2 x M2.6x8 Countersunk screws

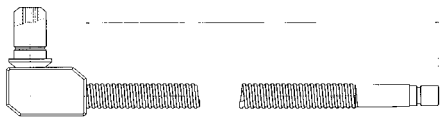
10714719 Toolset

Delivered with each unit.

Contains:

1. 1 x Hexagon Wrench Set
2. 1 x T-Wrench (17)
3. 1 x Wrench for M14
4. 1 x Screwdriver cross slot
5. 5 x Cable tie
6. 2 x 10A fuse
7. 2 x 8A fuse

10448095SP Fibre optics, lenght=4.85m



Stock n°	Description / Specification	Remark	Drawing
10182490	Power cable 5m CH		
10445664	Power cable 5m USA		
10445665	Power cable 5m EU		
10445666	Power cable 5m BS		
10280636	Power cable 2.5m CH		
10445661	Power cable 2.0 m US		
10445662	Power cable 2.0m EU		
10445663	Power cable 2.0 – 2.5 m BS		

Stock n°.	Description / Specification	Remark	Drawing

Base

10714720	Base complete delivery time on request		
10714721	Castor		
10714722	Damper for castor		
10714723	Nut set for castor	self locking nut M10 SW17	
10711948	Rubber pad	like OH3	
10714724	Protector	including screws	

Stock n°	Description / Specification	Remark	Drawing
10714725	Lock pedal delivery time on request		
10711946	Blue damper for brake 1,3	like OH3	
10714726	Fan for DC power module/Xenon power supply MD925A-24; with 2 pole connector		

Stock n°.	Description / Specification	Remark	Drawing

Tower/Column

10714727 Transformer unit complete

delivery time on request

10714728 Transformer (100-240V out)

delivery time on request

10714729 Transformer (36V out)

delivery time on request

10714730 DC power module 24V OH1000B

10714935 DC power module 12V/19V (options supply) OH41011 11

Stock n°	Description / Specification	Remark	Drawing
10711983	Power inlet	like OH3: type SW2A2 & SW950A1	
10714731	Main line filter	type SUP-P15H-R-0	
10714732	Line filter Xenon & AC outlet	type SUP-P10H-R-0	
10711023	Main switch	like OH3: type LLK25L 10A 250V	

Stock n°.	Description / Specification	Remark	Drawing

Tower/Column – light source

10714734 Light source complete (bulbs not included)

10714734R Light source complete – replacement part

10714735 Motor for lamp change

10711980 Microswitch for bulb door like OH3

10714737 Microswitch for bulb detection

10714738 Motor for filter wheel and light control (attenuator)

Stock n°	Description / Specification	Remark	Drawing

10714982 Filter Wheel with heat protection filter

delivery time on request

10713835 Heat protection filter

10714739 Attenuation filter

10711989 Fan for Xenon bulb like OH3: MD925A-24L: with built-in sensor

10714726 Fan for DC power module/Xenon power supply

MD925A-24; with 2 pole connector

10714742 PCB OH4 1012 (Lamp ON/OFF board)

10714743 PCB OH41021 (Filter wheel board)

Stock n°.	Description / Specification	Remark	Drawing
10714744	PCB OH41022	(Attenuator board)	
10448022	Xenon lamp		
10712861	Xenon power module	LMS supply	

Stock n°	Description / Specification	Remark	Drawing

Tower/Column control unit

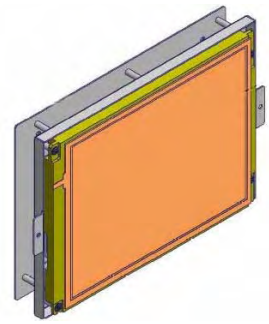
10714746 Control panel frame including harness

delivery time on request

10714747 Switch for lamp and autobalance

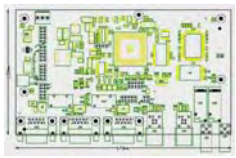
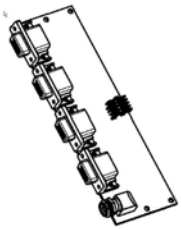
10714123 OH4 control unit frame, display and PC

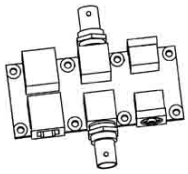
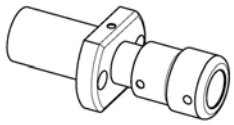
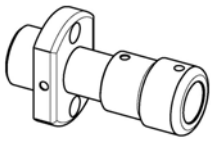
10714123R OH4 control unit – replacement part



10714124 Display 10.4” with touch panel

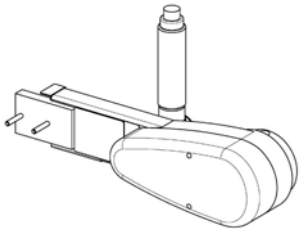
10714582 Flash card with latest SW (10714581)
available after next SW-release (appr. May 2007)

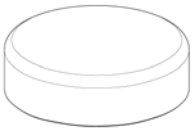
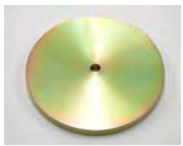
Stock n°.	Description / Specification	Remark	Drawing
10714748	PCB OH41014 (master controller)		
10714127	OH4 adapter		
10714130	MDC Microscope device controller (HW like M844!)		
10714132	SVGA switch board		
10714749	DC12V output plug		
10714750	DC19V output plug		

Stock n°	Description / Specification	Remark	Drawing
10714133	Standard connector board	LMS supply	
10714751	Bracket for standard connector board delivery time on request		
10714752	Fan for tower ventilation	MD825B-24, with connector	
10714897	Lock for brake 2 delivery time on request		
10714898	Lock for brake 3 delivery time on request		
10714753	Stop for vertical arm rubber	including allen screw M3x15	
10714754	Column handle delivery time on request		

Stock n°.	Description / Specification	Remark	Drawing

D-balance module

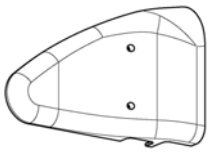


10714756	cover for D-balance module delivery time on request		
10714757	D-balance motor	type SS23F	
10714758	Set of belts for D-balance		
10714759	Cover for D weights delivery time on request		
10711930	Removable weight 5mm	like OH3	
10711931	Removable weight 15mm	like OH3	

Stock n°	Description / Specification	Remark	Drawing
10714760	Fixed weight (rear) delivery time on request		
10714761	Fixed weight (front) delivery time on request	including o-ring and warning labels	
10714762	Micro switch for D-balance	set of 2	
10714763	O-ring		
10714764	PCB OH41019 (D axis horizontal)		
10714789	PCB OH41020 (D axis vertical)		

Stock n°.	Description / Specification	Remark	Drawing

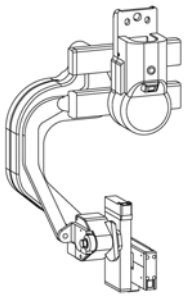
Swing arm large

10714766	Front cover delivery time on request	including 2x Allen screw M3x20	
10714767	Rear cover delivery time on request	including 2x Allen screw M3x30	
10714768	Cap of swing arm large (top) delivery time on request		
10712013	Seal of Link arm	like OH3	
10712014	Cap of Link arm	like OH3	
10714770	Horizontal arm delivery time on request		

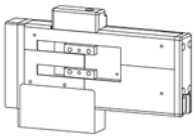
Stock n°	Description / Specification	Remark	Drawing
10712016	Cap for horizontal arm	like OH3	
10712015	damper horizontal arm	like OH3	
10714771	Brake 4 unit delivery time on request		
10714772	Cover at brake 4	including 1x Allen screw M3x8	

Stock n°.	Description / Specification	Remark	Drawing

Swing carrier



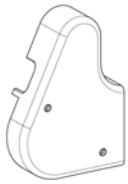
10714773	Swing carrier	complete unit
10714773R	Swing carrier	complete unit; exchange part



10714774	A slide module delivery time on request
10714774R	A slide module - replacement part delivery time on request

10714775	Brake 6 with B slide module delivery time on request
10714775R	Brake 6 with B slide module delivery time on request

10714777	Lower cover	incl. 2 screw M3x30

Stock n°	Description / Specification	Remark	Drawing
10714778	Upper cover delivery time on request	including 2x Allen screw M3x32	
10714779	Cover at brake 5	including 2x countersunk screw M3x10	
10714779R	Cover at brake 5 – replacement part		
10714780	Button (AC/BC)		
10714790	Motor C	Type HG37-060-AB-00	
10712258	Belt for motor C	like OH3: S3M276	

Stock n°.	Description / Specification	Remark	Drawing
10714783	C axis balance micro switch set of 2: including 0.03 mm shim		
10714786	PCB OH41015	(axis 4)	
10714787	PCB OH41016	(swing arm small)	
10712025	Belt for motor Y	like OH3: S2M84	
10714782	AB axis balance micro switch including 0.03 mm shim		

Stock n°	Description / Specification	Remark	Drawing
10714784	Motor for A or B	LC22G-103 /25:1	
10712256	Belt for motor A or B	like OH3: S2M134	
10712028	Switch for manual balance	like OH3 (axis A, B, or C)	
10712029	Switch for A/B position detection	like OH3	
10714785	PCB OH41017 (A slide)		
10714788	PCB OH4 1018A (B slide)		

Stock n°.	Description / Specification	Remark	Drawing

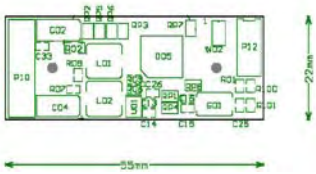
Handgrip

10714791 Handgrip left, complete with cable (without joint)

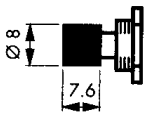
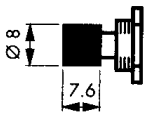
10714792 Handgrip right, complete with cable (without joint)

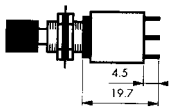
10711939 joystick for handgrip like OH3

10719027 CAN controller handgrip like OH3
Set (contains controller left and controller right)



10712252 Handgrip Stopper plate like OH3
incl. 2 screws M2x5

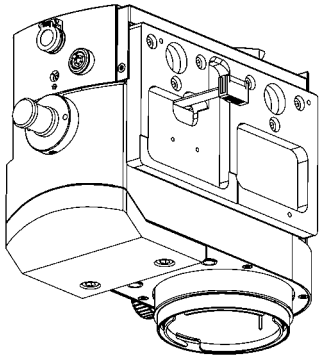
Stock n°	Description / Specification	Remark	Drawing
10711940	Handgrip joint left delivery time on request	like OH3	
10711941	Handgrip joint right	like OH3	
10711942	Lever 1 for handgrip incl. washers and bearing	like OH3	
10712023	Lever 2 for handgrip incl. washers and bearing	like OH3	
10708633	Button, black, ∅8mm	like OH3	
10710089SP	Button, white, ∅8mm	like OH3	

Stock n°.	Description / Specification	Remark		Drawing
10710090SP	Push button switch	without button	like OH3	
10714793	Cover type nut for switches (long)			
10714794	Cover type nut for switches (short)			

Stock n°	Description / Specification	Remark	Drawing

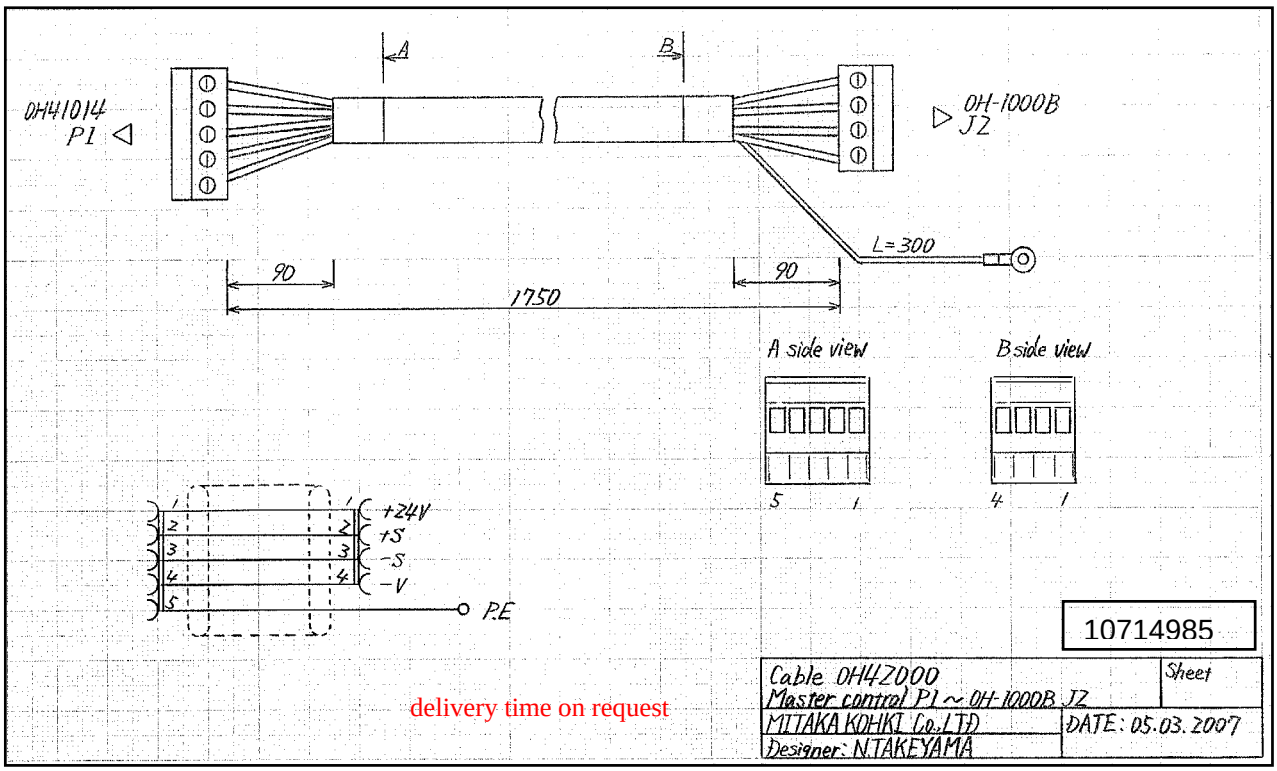
Optics carrier M525 OH4

10448238R	Optics carrier M525 OH4	exchange part	

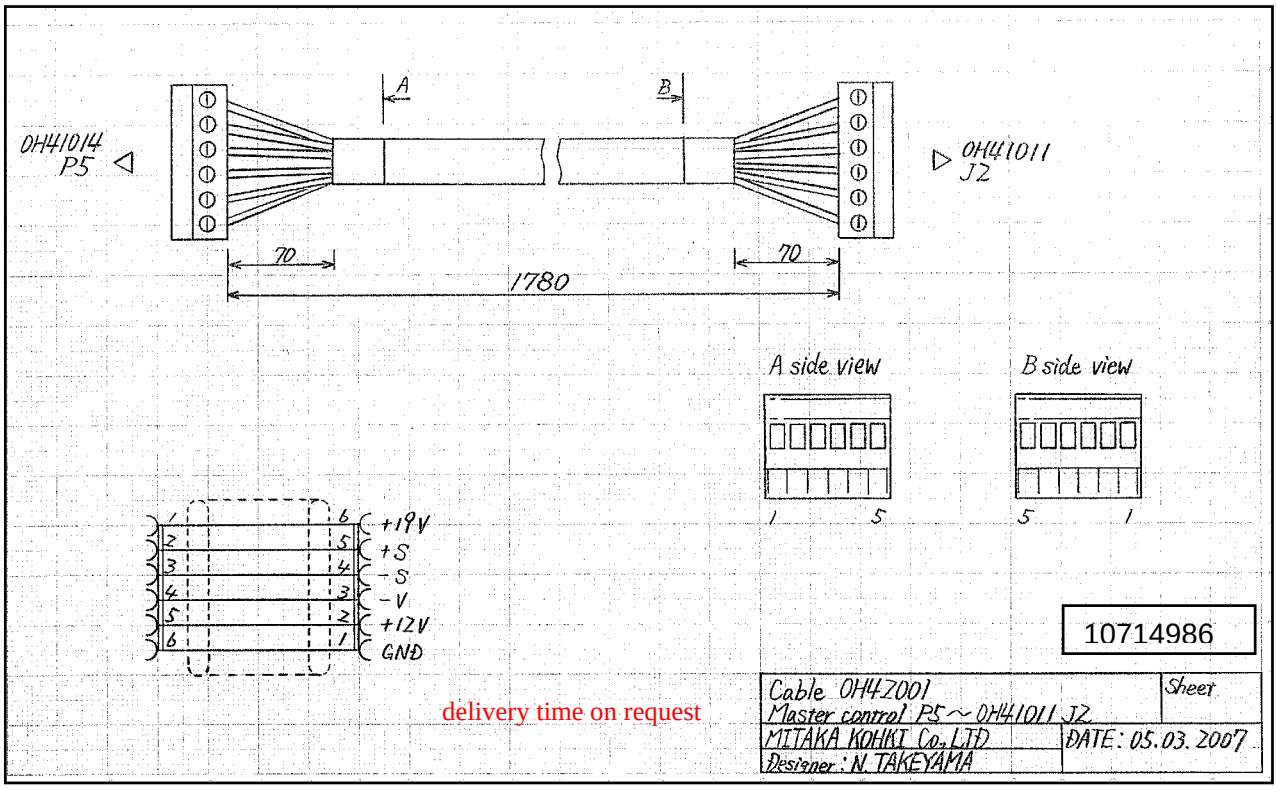


Stock n°.	Description / Specification	Remark	Drawing

Cable



delivery time on request



delivery time on request

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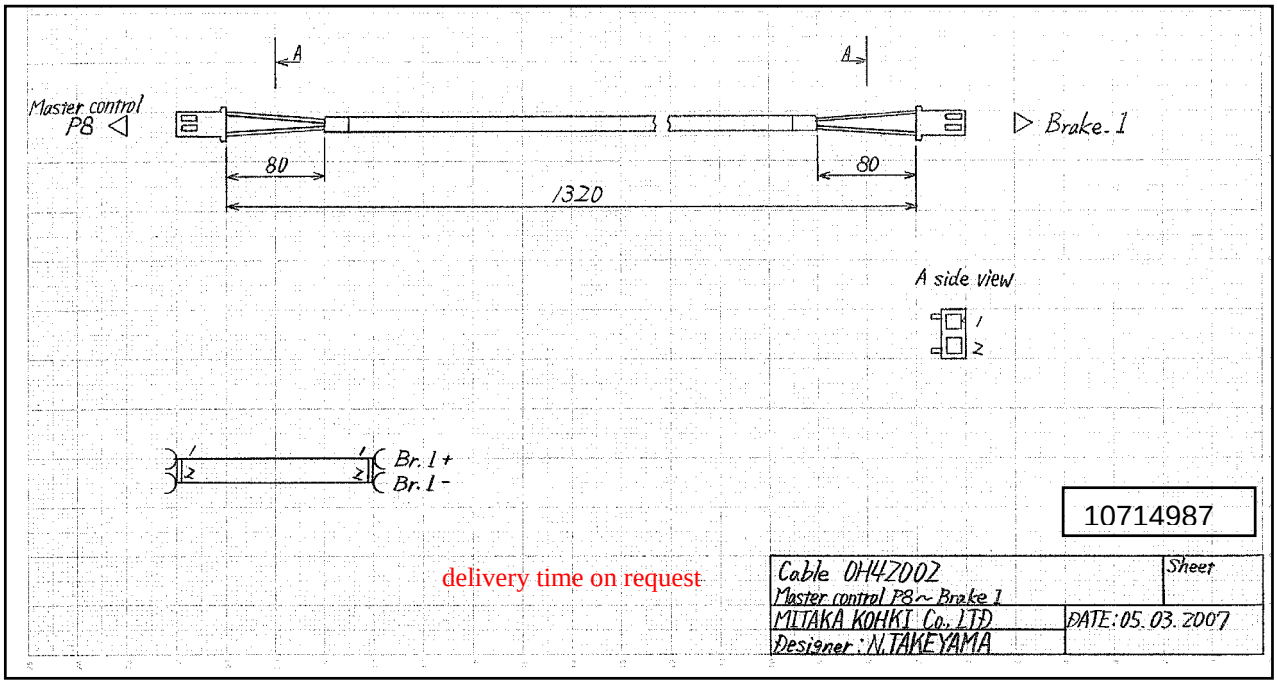

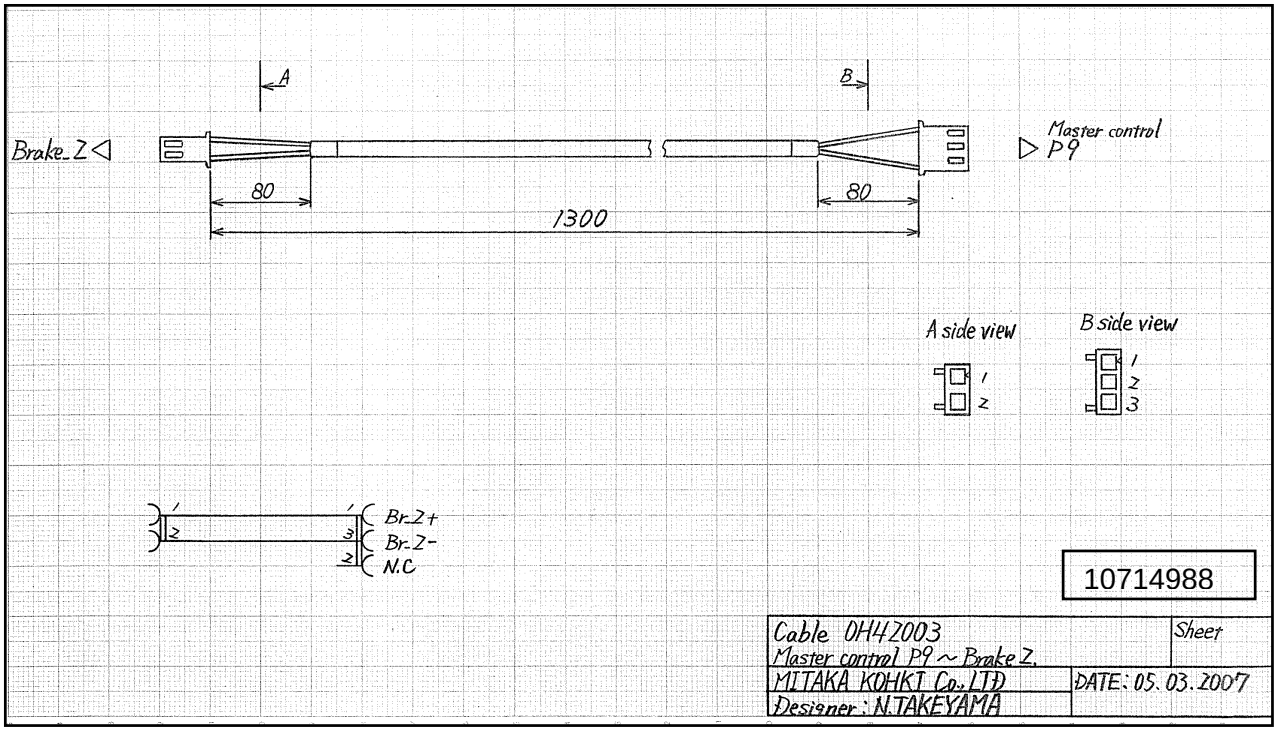

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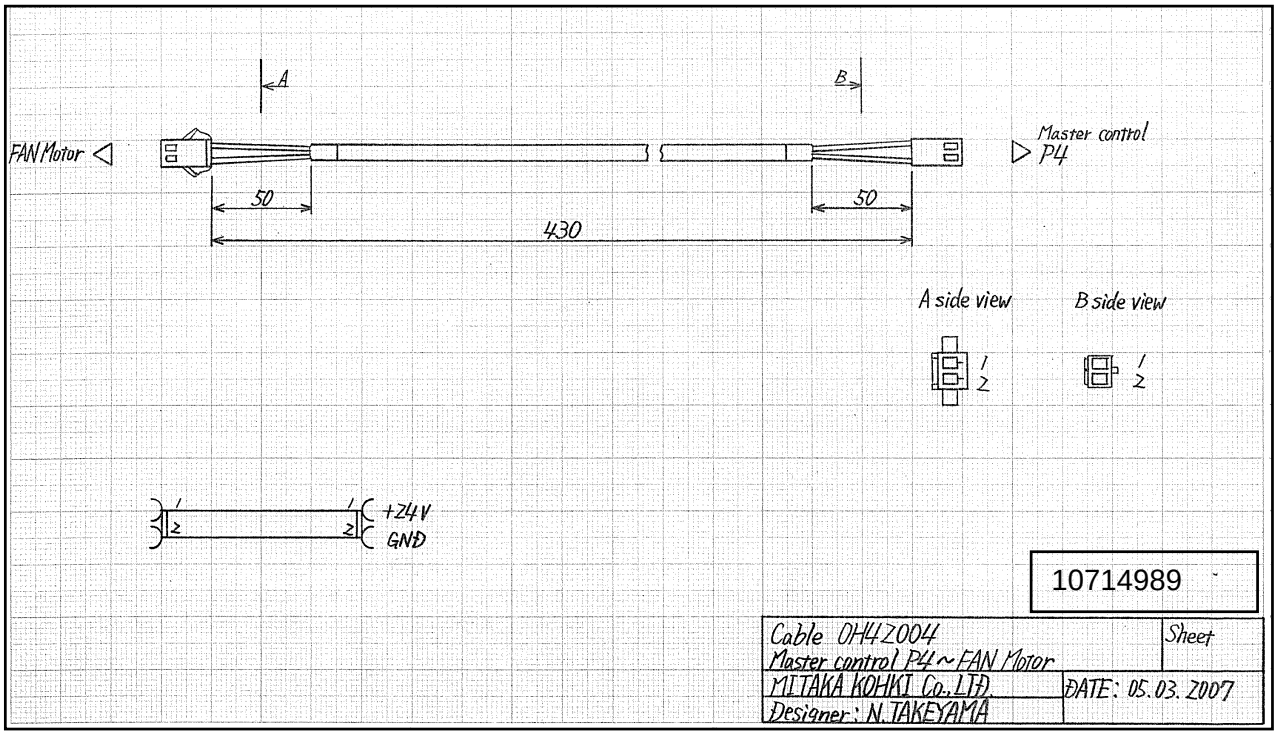

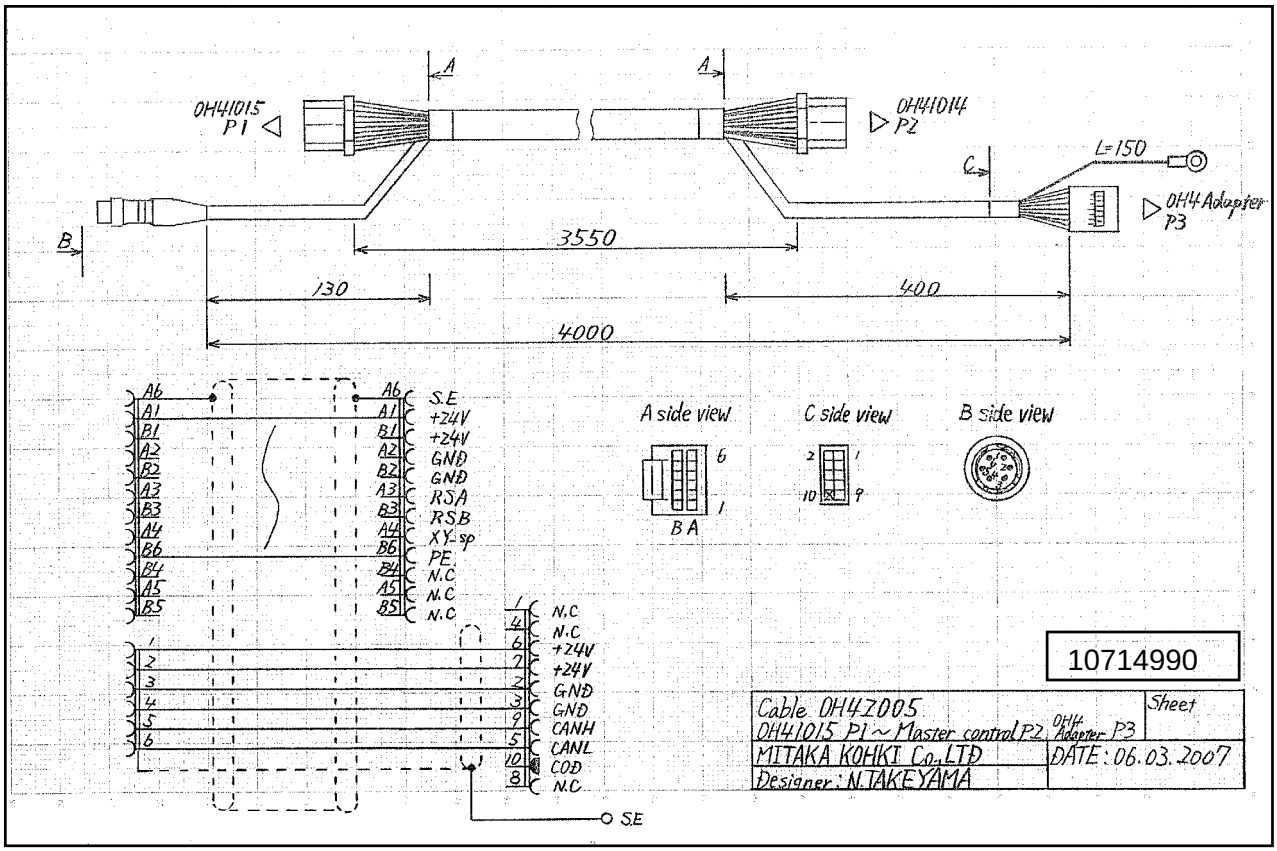

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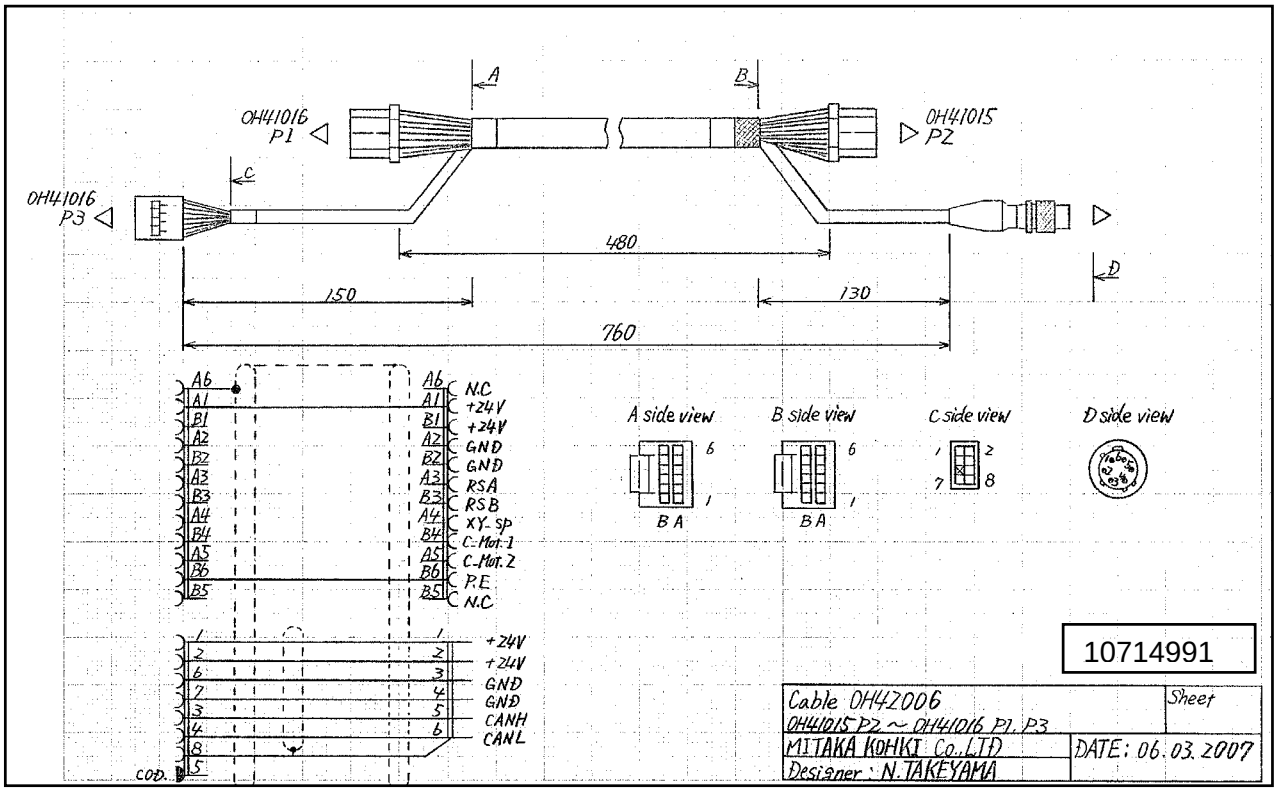

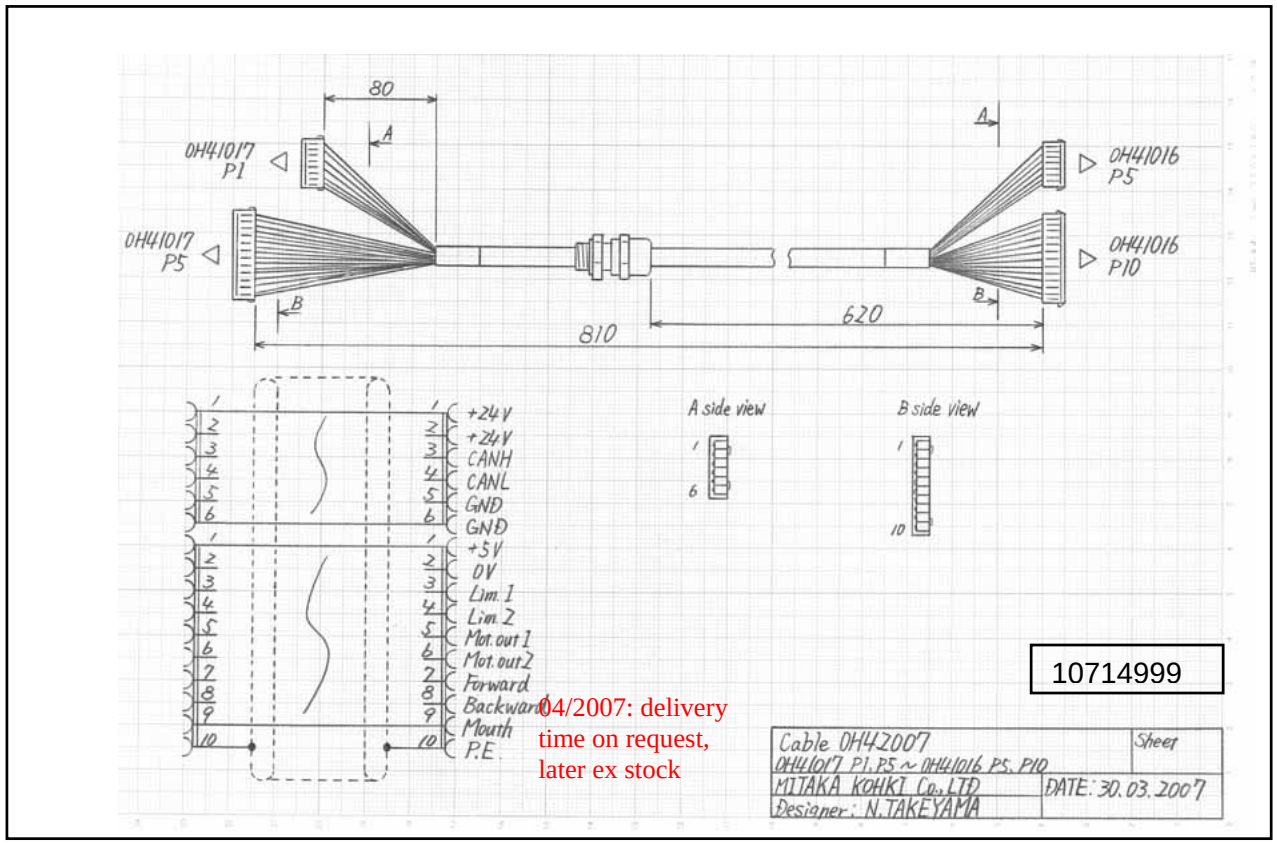

04/2007: delivery time on request, later ex stock

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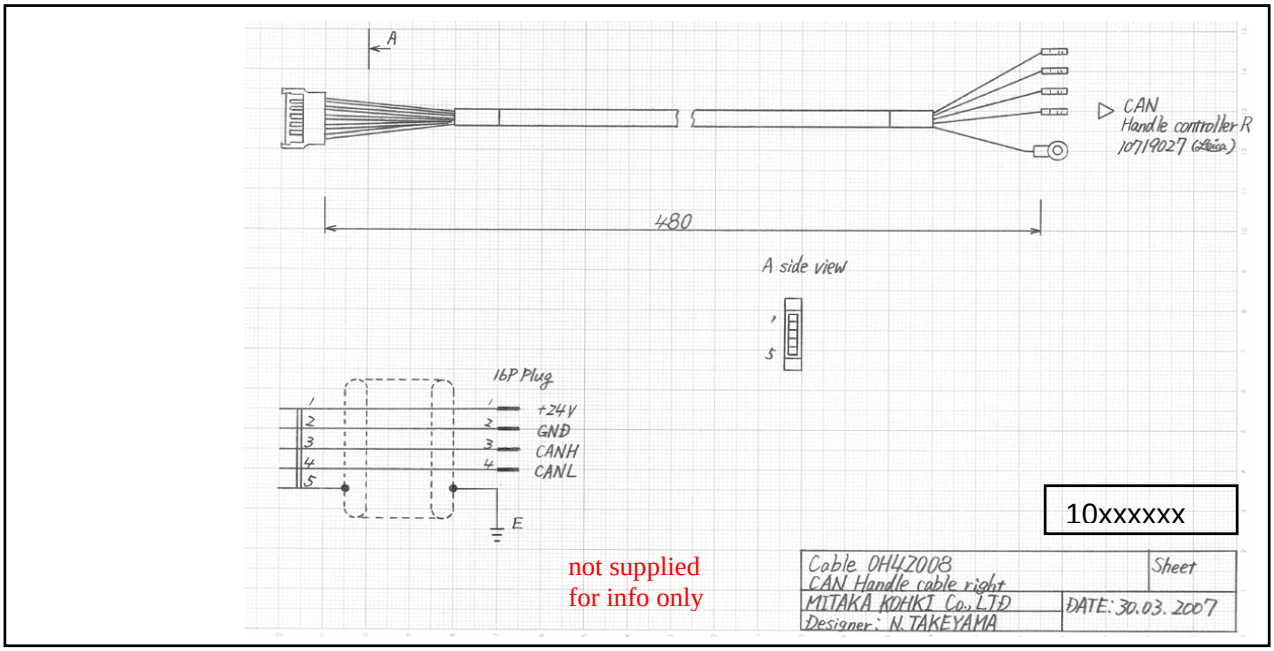

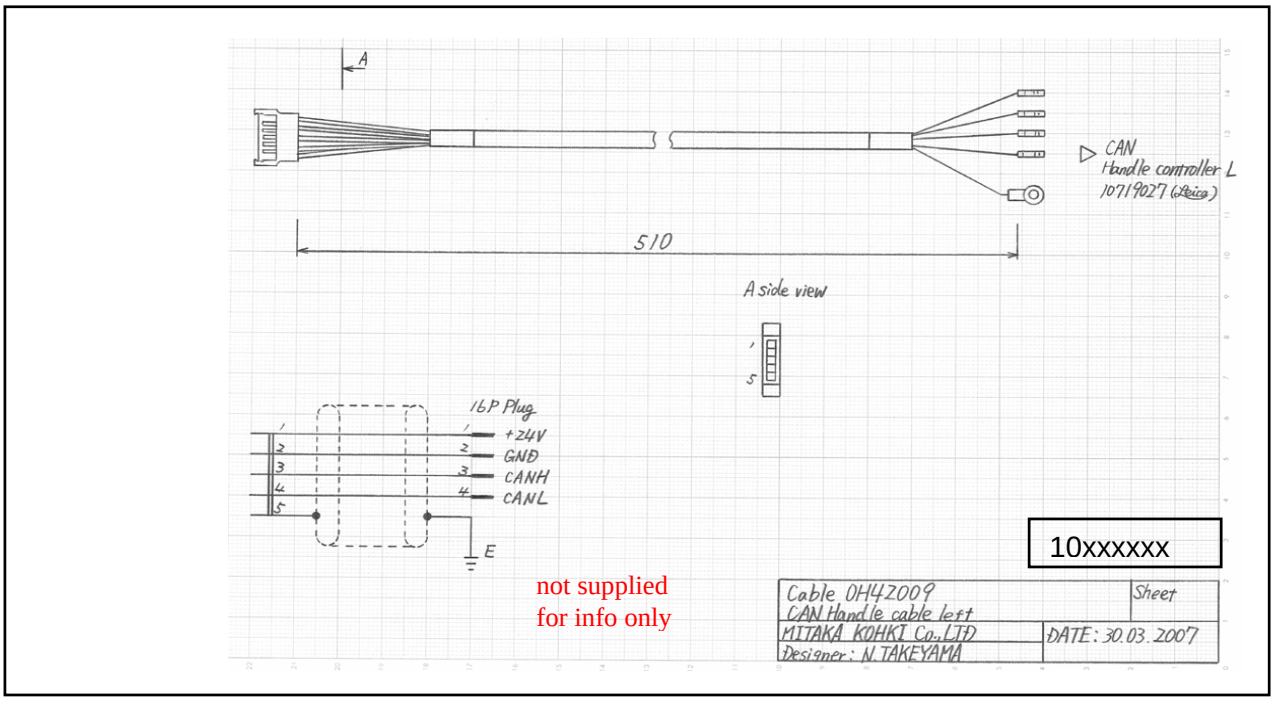

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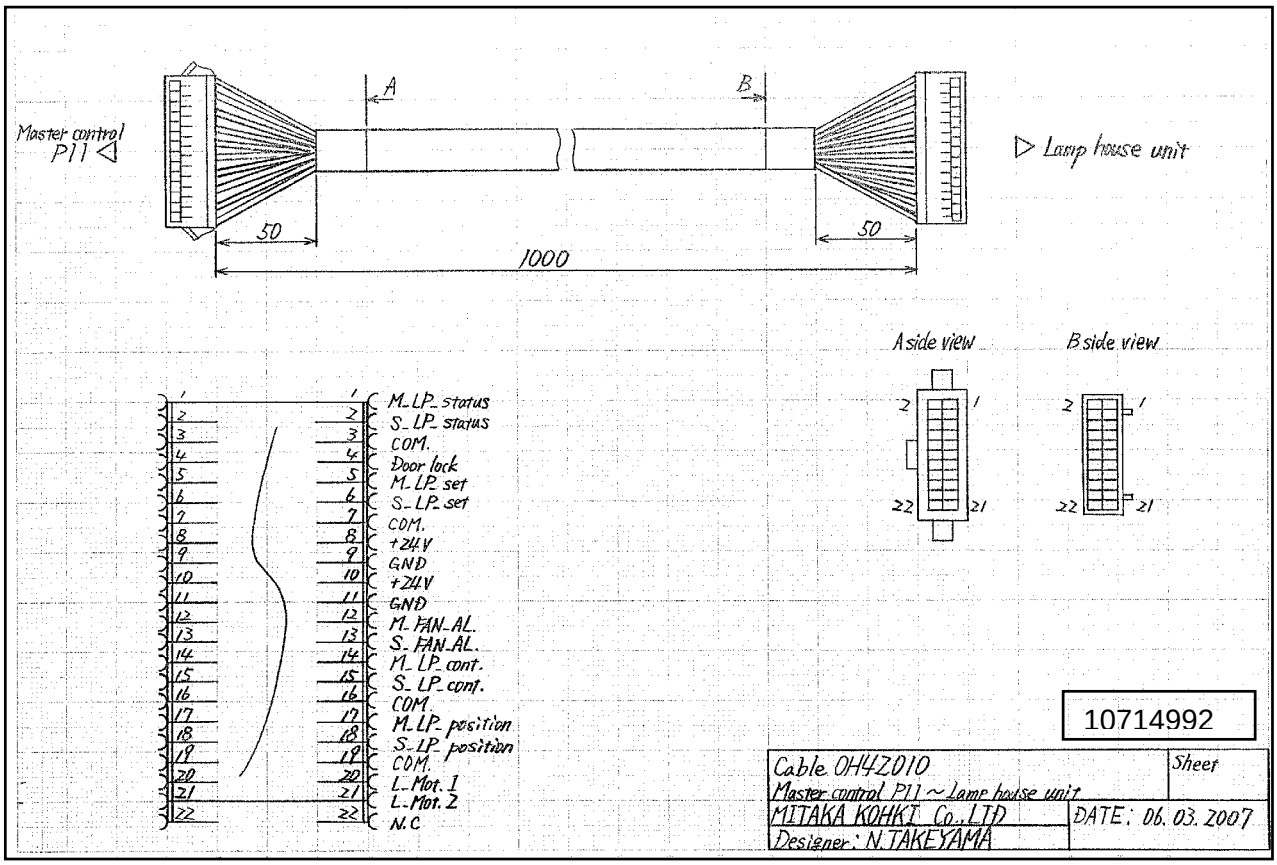

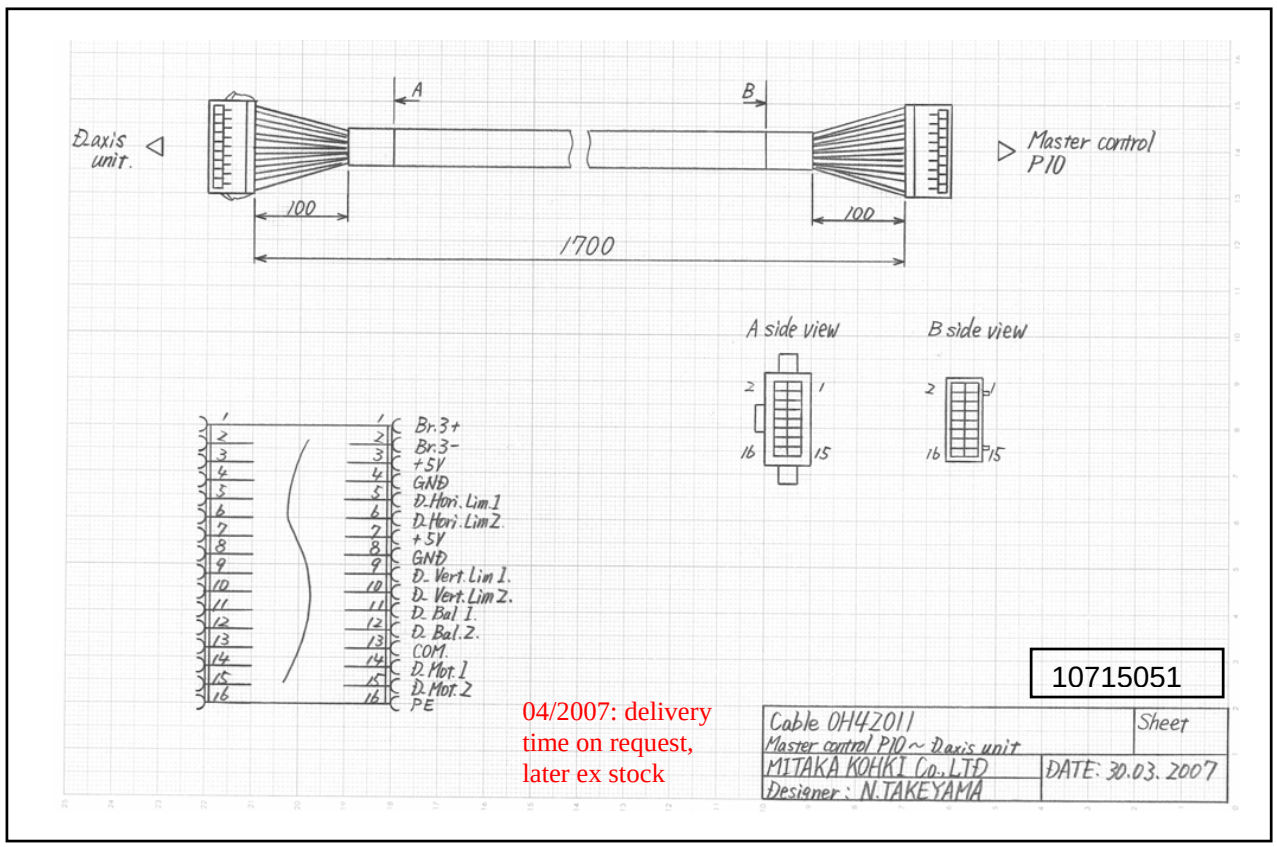

04/2007: delivery time on request, later ex stock

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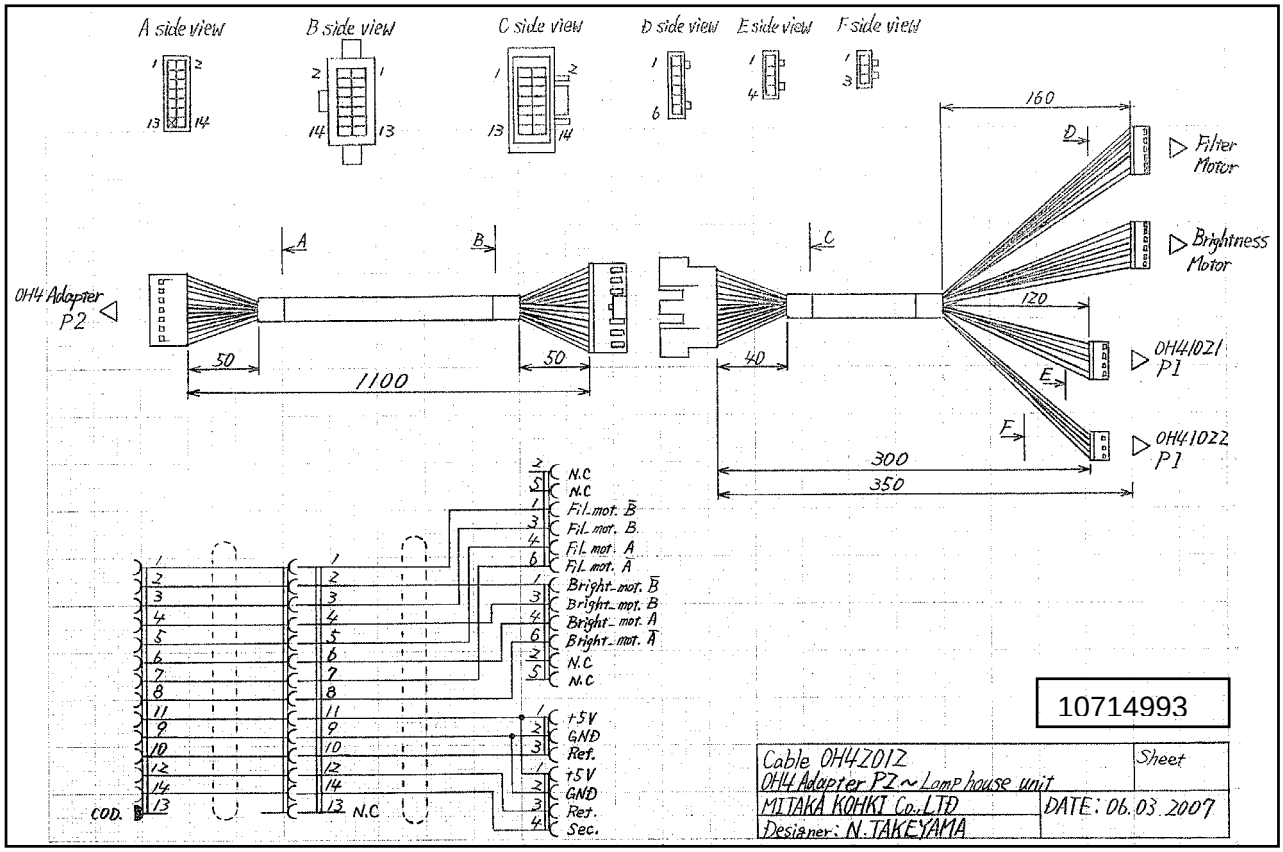

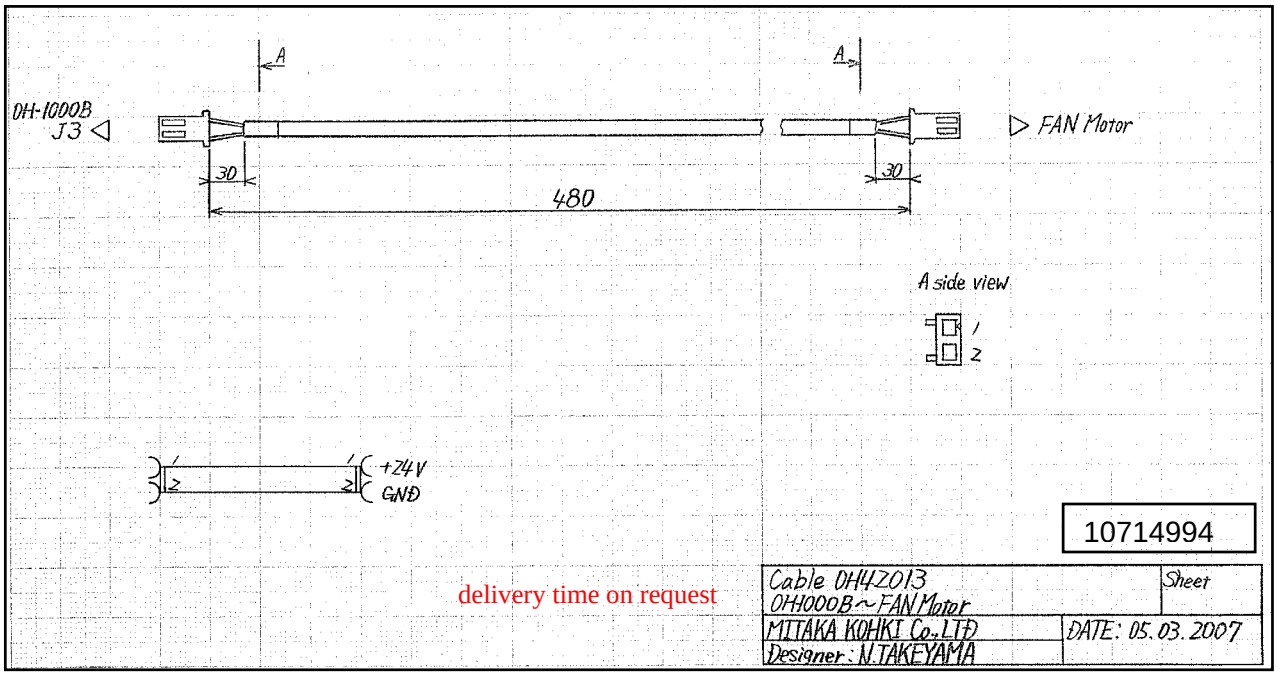

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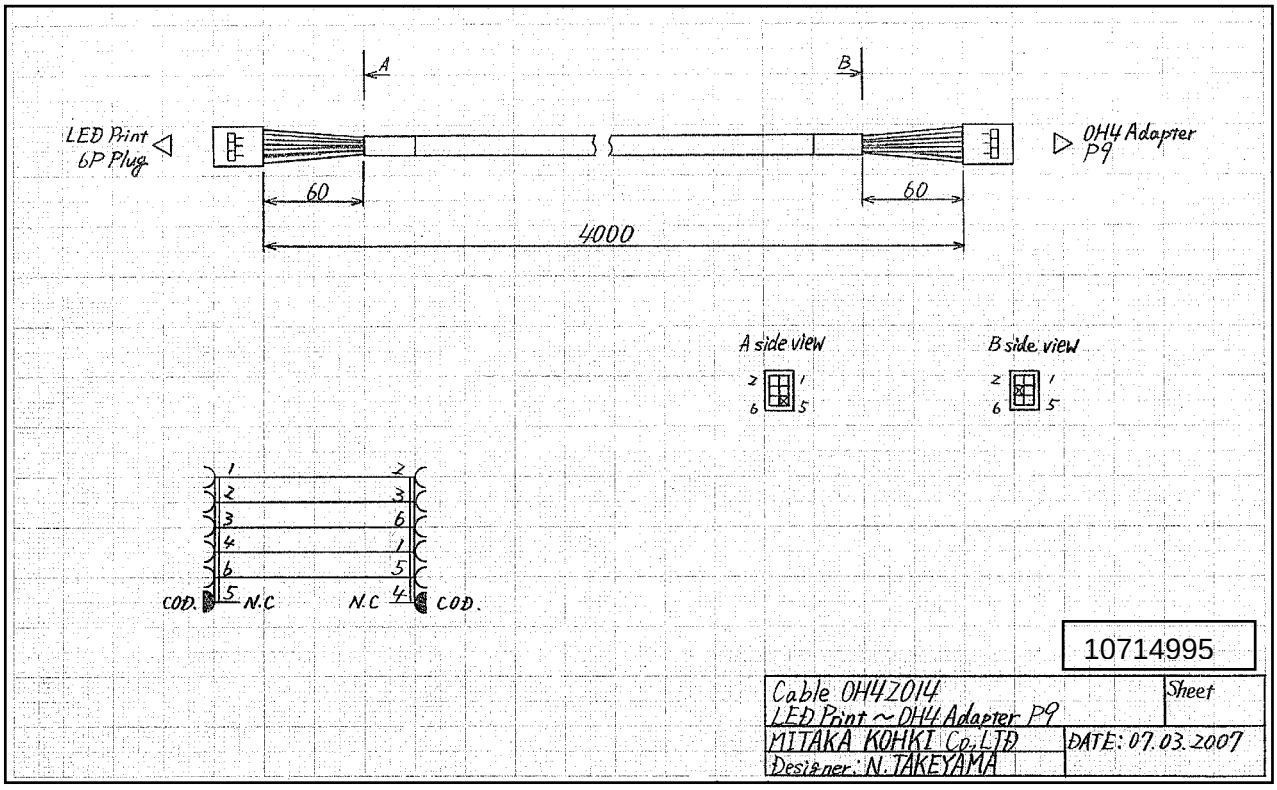

D-balance cable
10xxxxxx

04/2007: delivery time on request,
later ex stock

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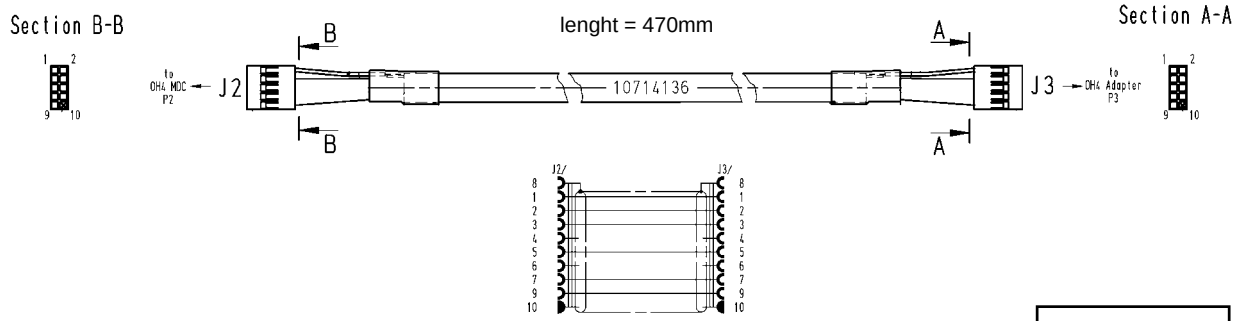
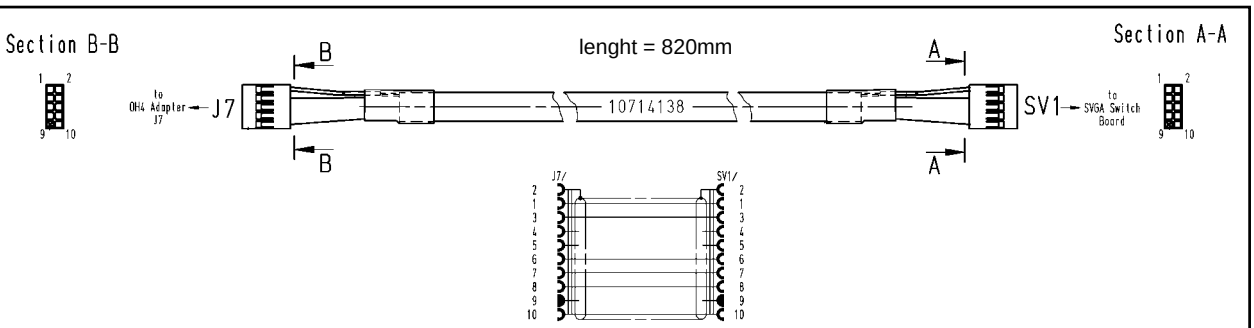


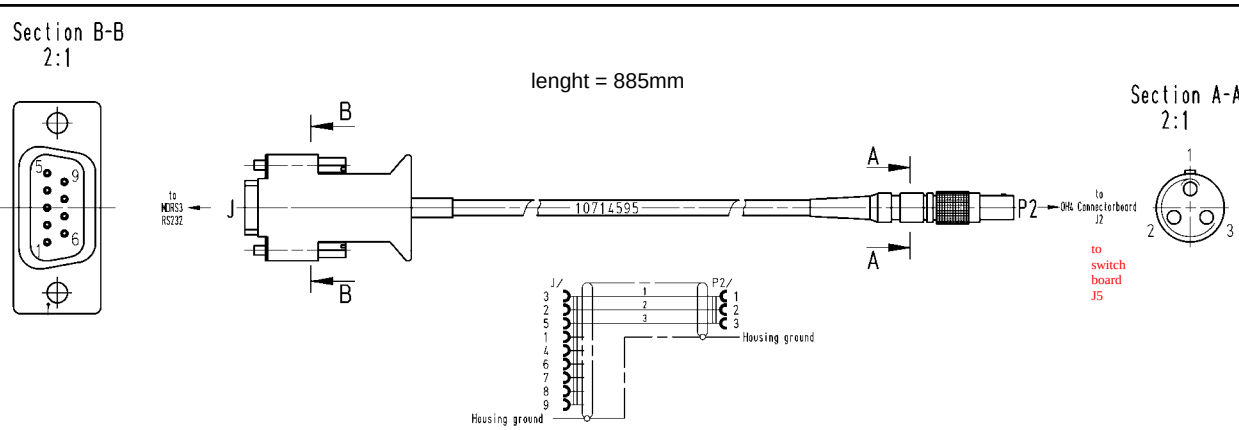
Data cable CAN MDC-OH4 adapter

10714136



Data cable OH4 adapter – SVGA switch board

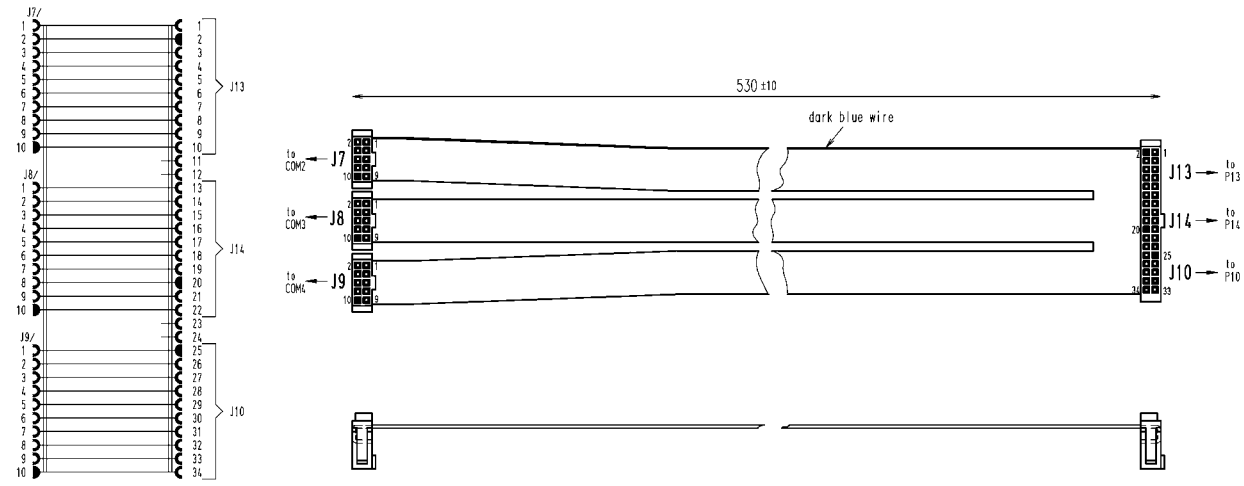
10714138



Data cable MDRS to OH4 SVGA switch board

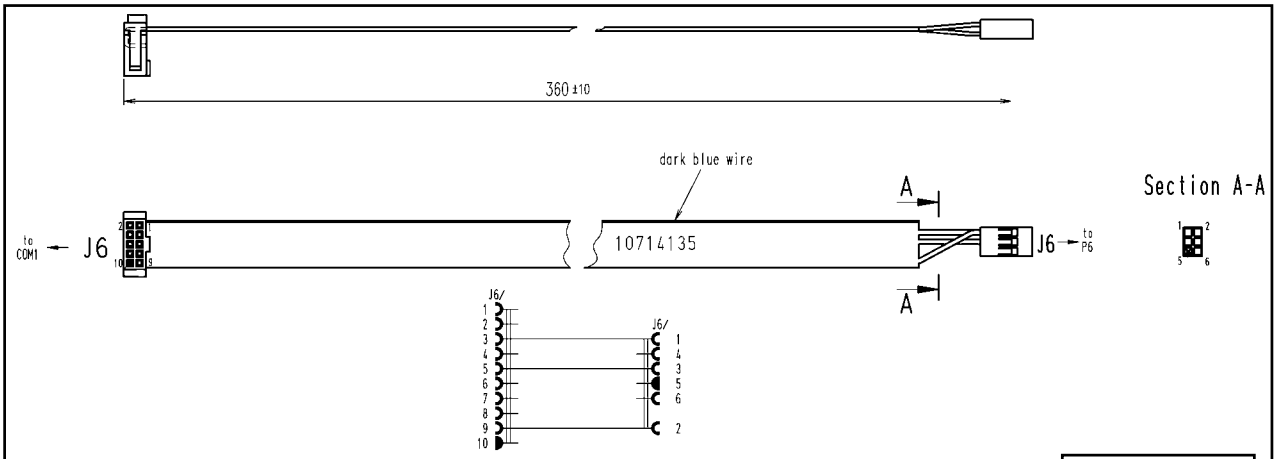
10714595

Stock n°	Description / Specification	Remark	Drawing



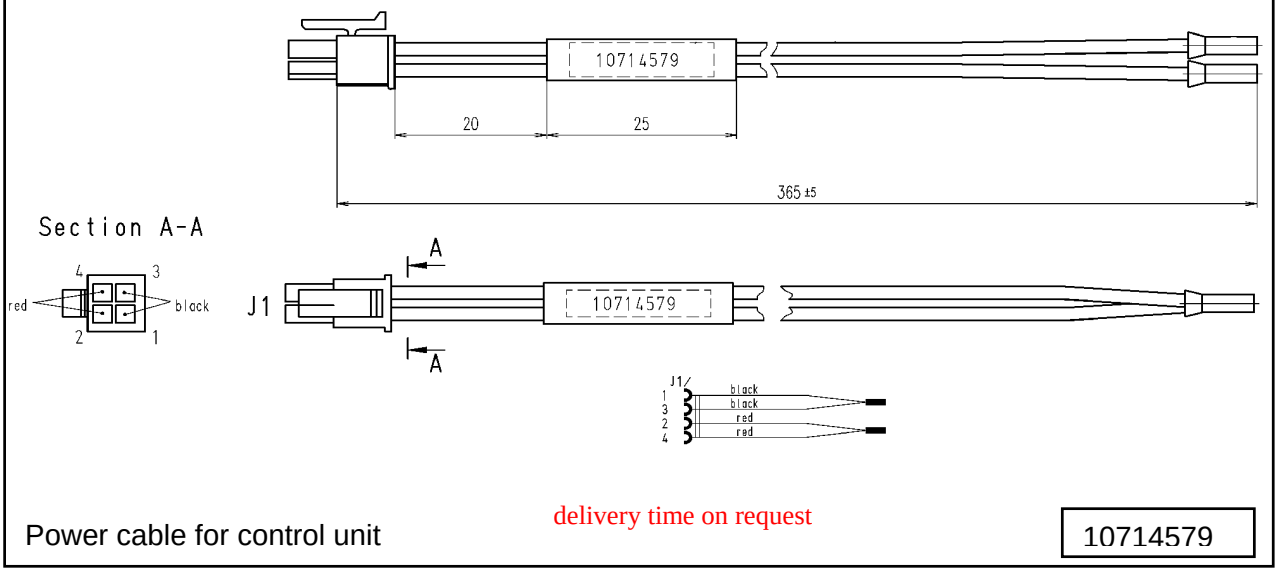
Data cable RS232 CU - MDC

10714134



Data cable RS232 CU – OH4 adapter

10714135



Power cable for control unit

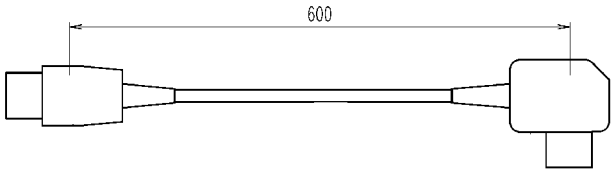
delivery time on request

10714579

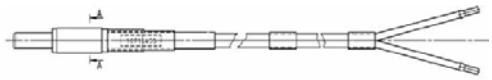
Stock n°.	Description / Specification	Remark	Drawing

Internal power distribution:

10712674 Power cable for. multi socket

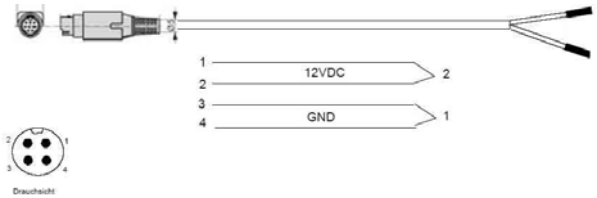


10714455 DC Power Cable for MDRS



final drawings not ready yet in PLM: Thm

10714602 DC Power cable for Monitor 19"



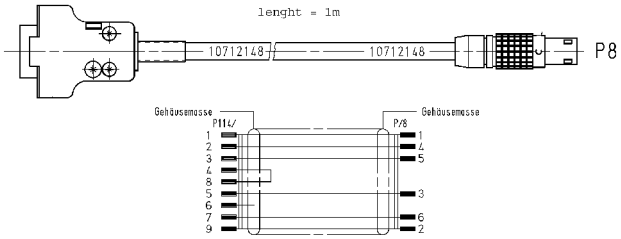
Stock n°	Description / Specification	Remark	Drawing

Tools

10714769 Download cable for master control software

10714583 USB stick OH4 Software

10712148 CAN cable for test purpose



Leica M525 OH4

User manual

10 714 367 – version -

Leica

MICROSYSTEMS

Thank you for purchasing a Leica surgical microscope system.

In developing our systems, we have placed great emphasis on simple, self-explanatory operation. Nevertheless, we suggest studying this user manual in detail in order to utilize all the benefits of your new surgical microscope.

For valuable information about Leica Microsystems products and services, and the address of your nearest Leica representative, please visit our website,

www.leica-microsystems.com

Thank you for choosing our products. We hope that you will enjoy the quality and performance of your Leica Microsystems surgical microscope.

Leica Microsystems (Schweiz) AG
Surgical Microscopy Business Unit

Introduction 3

Controls 6

Preparation for operation 21

Use 37

Safety notes 58

Care and maintenance 68

What to do if...? 73

Technical data 77

screen

Introduction
- User manual 3
- Product identification 3
- Symbols in this user manual 3
- Design 4

Controls
- Leica M525 microscope with swing arm 6
- Control unit 7
- Terminals 7
- Stand 8
- CAN handles 9
- Mouth switch 9
- Footswitch 9
- Beam splitter 17
- Beam splitter with counterweight 17
- 180° assistant's attachment 17
- Ultra Observer Leica ULT500 17
- Dual Imaging Color Module Leica DI C500 18
- Stereoscopic co-observer tube 18
- Tubes 18
- Video and photo accessories for Leica M525 20

Preparation for operation
- Checklist: before the operation 21
- Installing optical accessories 22
- Setting the tube 23
- Setting the eyepiece 24
- Installing documentation accessories 24
- Selecting documentation accessories 26
- Stand settings 27
- Changing the weight disk on the D-axis 33
- Releasing the brakes 34
- Transport, transporting and rest positions 35
- Positioning on the operating table 36
- Attaching sterile controls 36

Use
- Positioning the microscope 37
- Adjusting the microscope 38
- Control unit with touch panel 43
- Leica DI C500 52
- Autofocus settings 54
- The Maintenance menu 56
- Microscope settings 57
- The "How to..." menu 57
- The Service menu 57

screen

Safety notes
- Intended use 58
- Directions for the person responsible for the instrument 58
- Directions for the operator of the instrument 59
- Dangers of use 60
- Manufacturer's declaration of electromagnetic compatibility (EMC) 62
- Signs and labels 66

Care and maintenance
- Maintenance instructions 68
- Cleaning the touch panel 68
- Maintenance 68
- Changing bulbs 69
- Checking the timer for the xenon lamp 69
- Changing fuses 70
- Notes on reprocessing of resterilizable products 71
- Instructions 71

What to do if...?
- General faults 73
- TV, photography 75
- Error messages on the control unit 76

Technical data
- Electrical data 77
- Leica M525 77
- Accessories 77
- IGS 78
- Fluorescence 78
- Floor stand 78
- Ambient conditions 79
- Standards fulfilled 79
- Limitations of use 79
- List of weights of balanceable configurations 80
- Dimensional drawings 81

User manual

In addition to instructions for use, this user manual also provides important safety notes (see the chapter entitled, "Safety notes").
Read the user manual carefully and thoroughly before placing the product in operation.

Product identification

The model code and serial number of your product are provided on the nameplate found on the illumination unit. Write this data into your user manual and always refer to it when you contact us or the service workshop regarding any questions you may have.

Model: Serial No.:

Symbols in this user manual

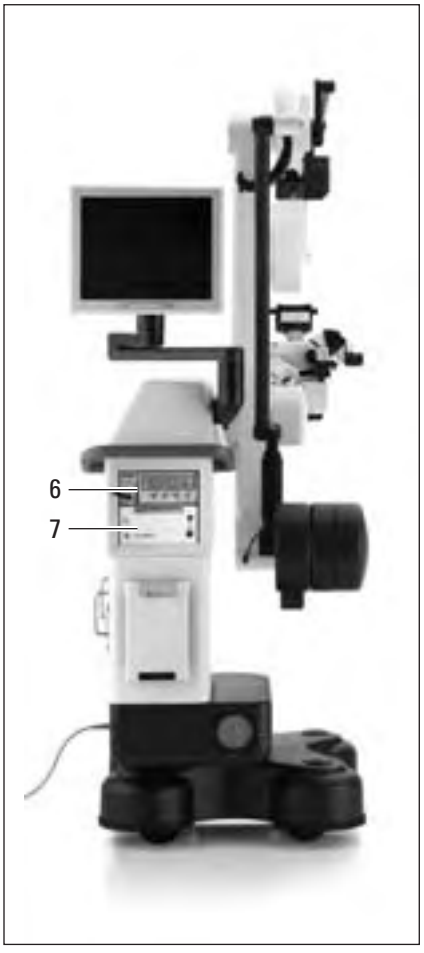
The symbols used in this user manual have the following meanings:

	Warning	Warning regarding use hazard or improper use which can cause serious personal injury or death.
	Caution	Warning regarding use hazard or improper use which can cause minor personal injury, but considerable damage to property, assets and the environment.
		Useful information that can help the user operate the product correctly and efficiently.
⇨		Call to action; here you are asked to do - something.

Design

surgical microscope Leica M525 OH4

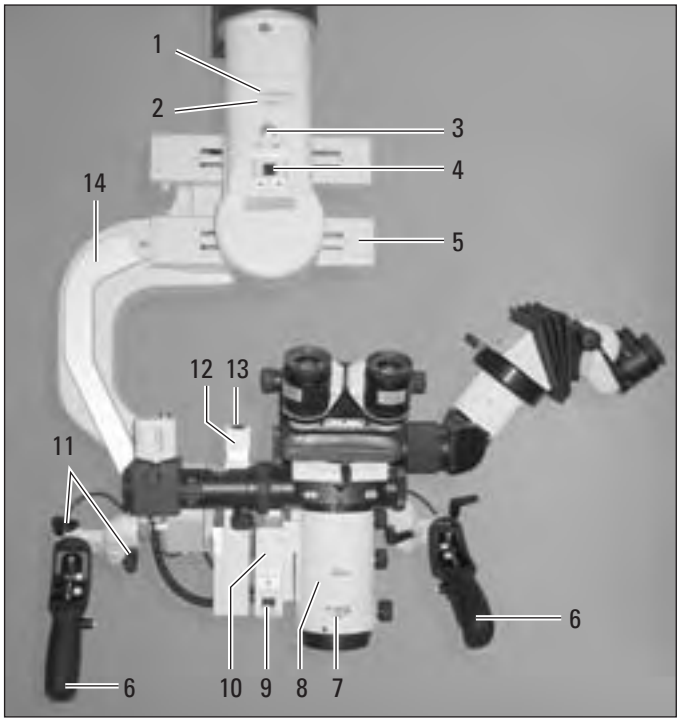
1 Swing arm
2 Tiebar
3 Video monitor (optional)
4 Control unit with touch panel
5 Suspension device for footswitch
6 Illumination unit
7 Base
8 Optical carrier Leica M525



1 Vertical arm
2 Terminals
3 Footbrake
4 Handle
5 Articulated arm for monitor
6 Camera control unit (optional)
7 System unit Leica MDRS3 (optional)

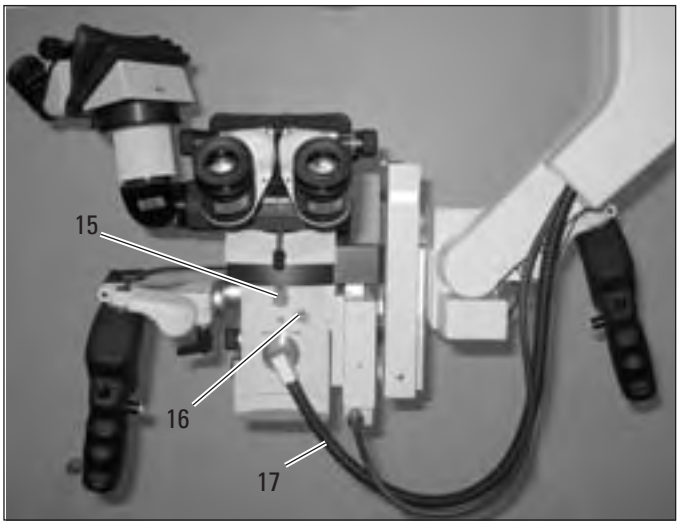
☞ The Leica M525 with its open architecture, offers space for accommodating the video control unit and the Leica MDRS3.

Microscope Leica M525 with swing arm

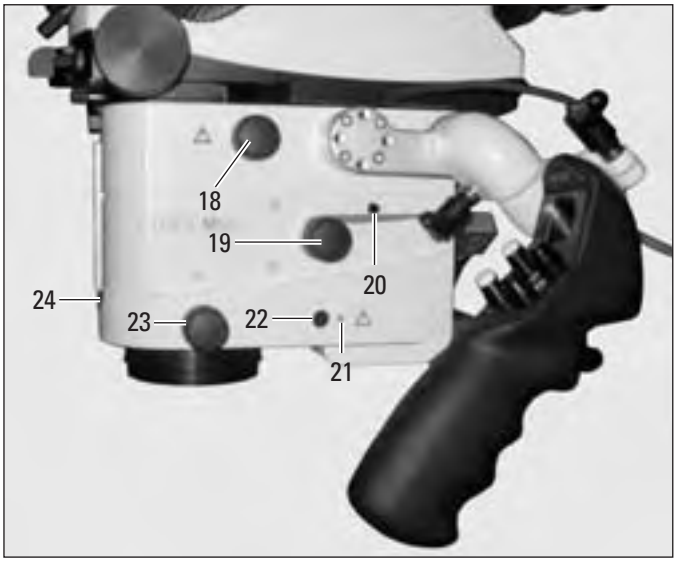


1 Status LED for fluorescence
- LED lights up white = white light mode
- LED lights up blue = blue light mode
- LED lights up yellow = NIR mode
- LED lights up green = Playback mode

2 Status LED for recording LED lights up red = recording in progress
3 Push-button for intraoperative AC/BC balancing
4 Switch for manual balancing of the C-carriage
5 C-carriage
6 CAN handle
7 Display of set working distance
8 Optical carrier M525
9 Switch for manual balancing of the A-carriage
10 A-carriage
11 CAN handle clamping lever
12 Switch for manual balancing of the B-carriage
13 B-carriage
14 Swing mount

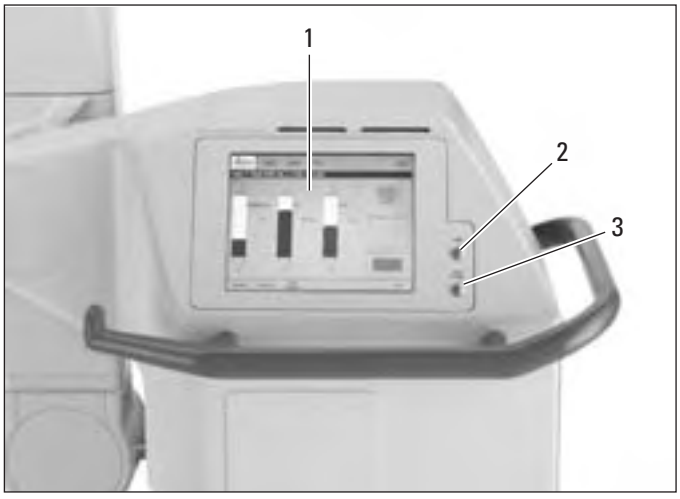


15 CAN socket for accessories (DI C500, FL400)
16 CAN socket (not used)
17 Optical fiber



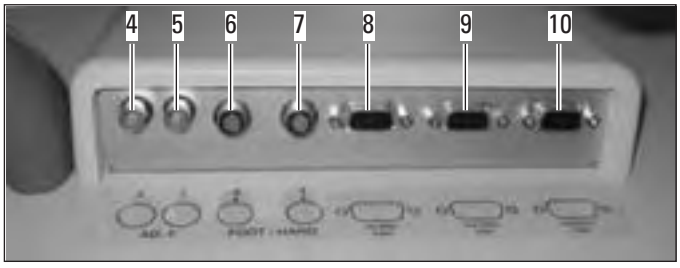
18 Rotary button for zoom adjustment
19 Rotary button for illumination field diameter adjustment
20 Reset button for zoom dependent illumination field diameter adjustment
21 Status of multifocus LED
22 Multifocus key
23 Rotary button for focus adjustment
24 Working distance display

Control unit



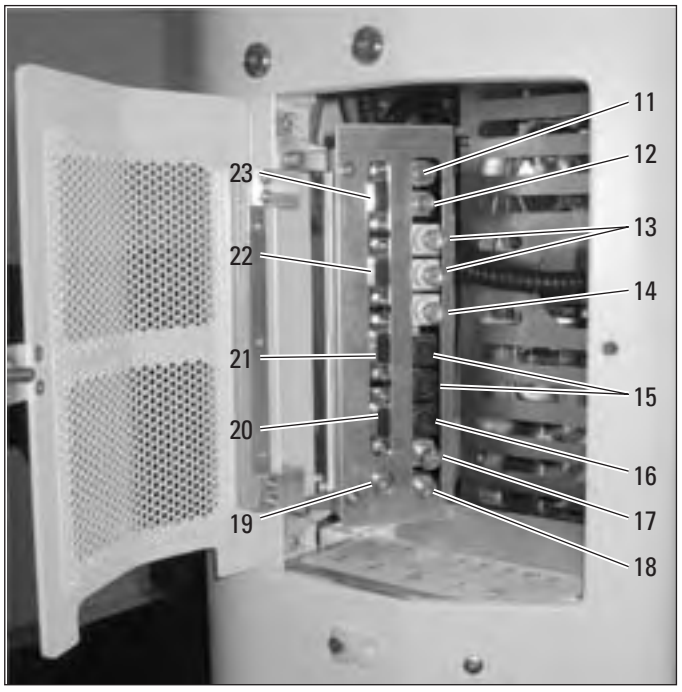
1 Touch panel
2 Push-button with illumination LED (on/off)
3 Push-button with LED for Auto Balance

Terminals

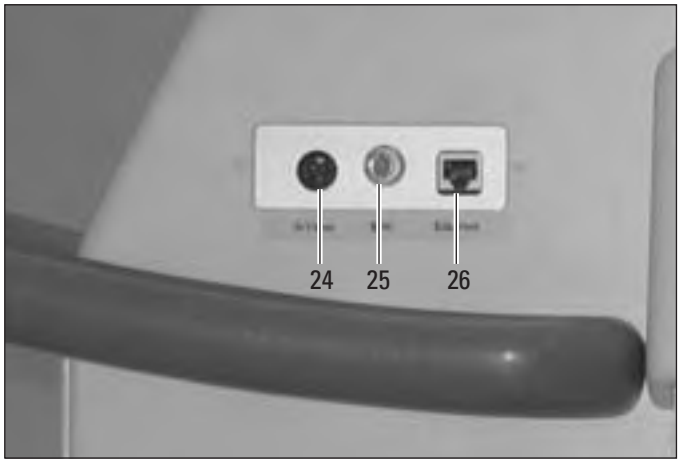


4 AD.F. Additional Function 2
5 AD.F. Additional Function 1
6 Footswitch or handswitch 2
7 Footswitch or handswitch 1
8 Internal CAN
9 External CAN
10 External CAN

AD.F. 1 and 2 are digital relay outputs that can switch 24V/2A.



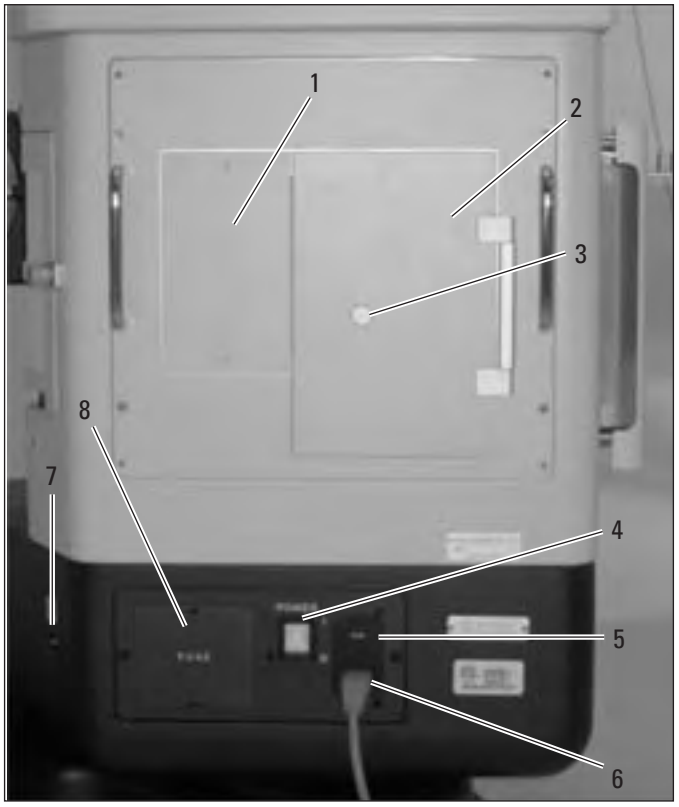
11 Storz light source
12 UV camera Hitachi
13 BNC IN (2x)
14 BNC OUT
15 S-Video IN (2x)
16 S-Video OUT
17 Storz footswitch
18 for Sony NIR camera
19 Leica MDRS3
20 SVGA IN 3
21 SVGA IN 2
22 SVGA IN 1
23 SVGA OUT to Leica DI C500



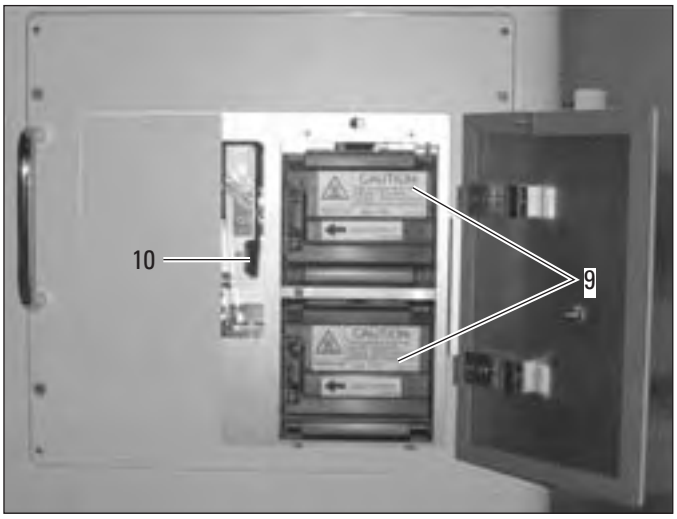
24 S-Video adapter
25 BNC adapter
26 Ethernet adapter

Terminals 24, 25 and 26 are adapters which can be used to lead out the terminals of the optional Leica MDRS3 system unit or a camera control.

Stand



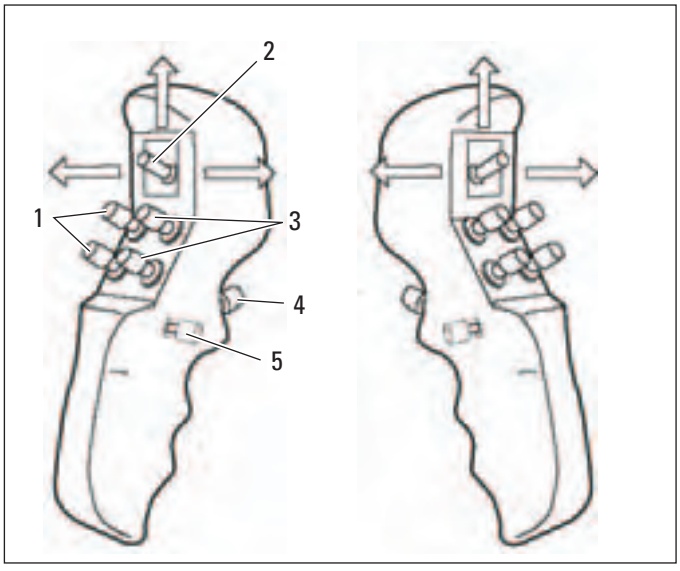
1 Illumination unit
2 Access door
3 Screw knob
4 Master switch for Leica M525 OH4 surgical microscope
5 Selector switch 100V/120V/220V/240V
6 Power supply
7 Potential equalization socket
8 Fuse box flap



9 Lamp inserts for main illumination or backup illumination
10 Lever for switching to standby illumination

The Leica M525 OH4 surgical microscope has a primary illumination source and an equivalent standby illumination source.

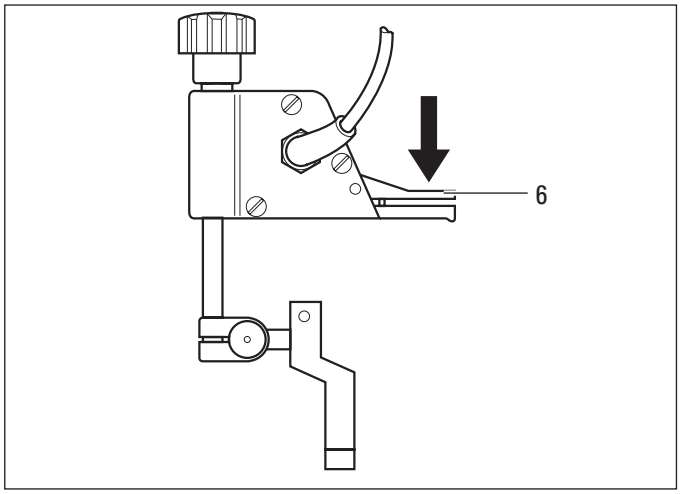
CAN handles



1 Zoom
2 4-function joystick
3 Focus
4 Release All Brakes
5 Release preselected brakes

☞ You can assign switches 1, 2, 3 and 5 of the CAN handles individually for each user in the configuration menu (see page 50).

Mouth switch



6 Release preselected brakes

Footswitch

Here you will find an overview of the footswitches which you can use to control your Leica M525 surgical microscope.

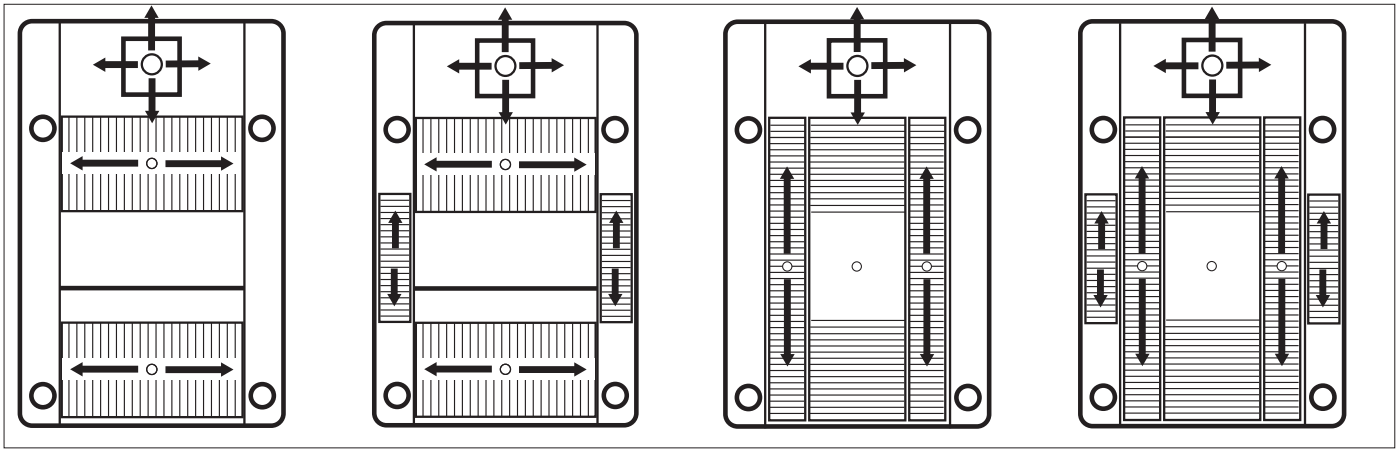
☞ Footswitches can be assigned individually for each user in the configuration menu (see page 48).

Footswitch 12 functions crosswise

Footswitch 16 functions crosswise

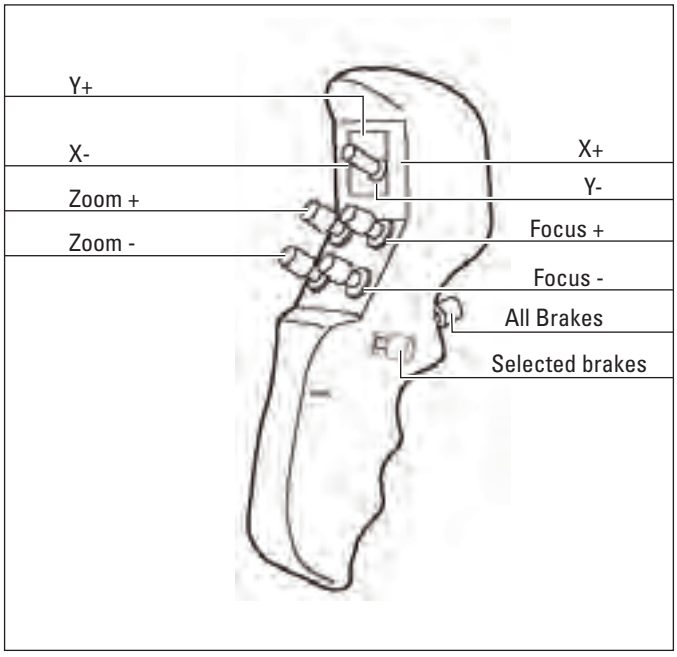
Footswitch 12 functions lengthwise

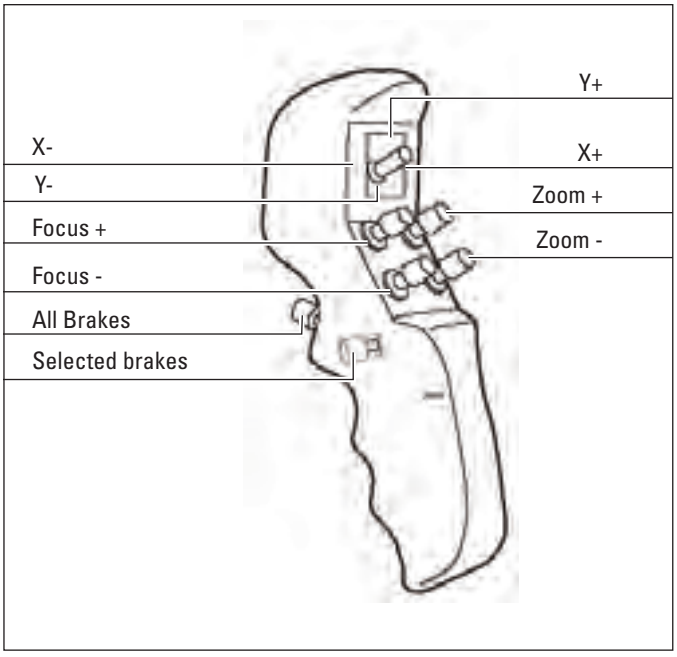
Footswitch 16 functions lengthwise

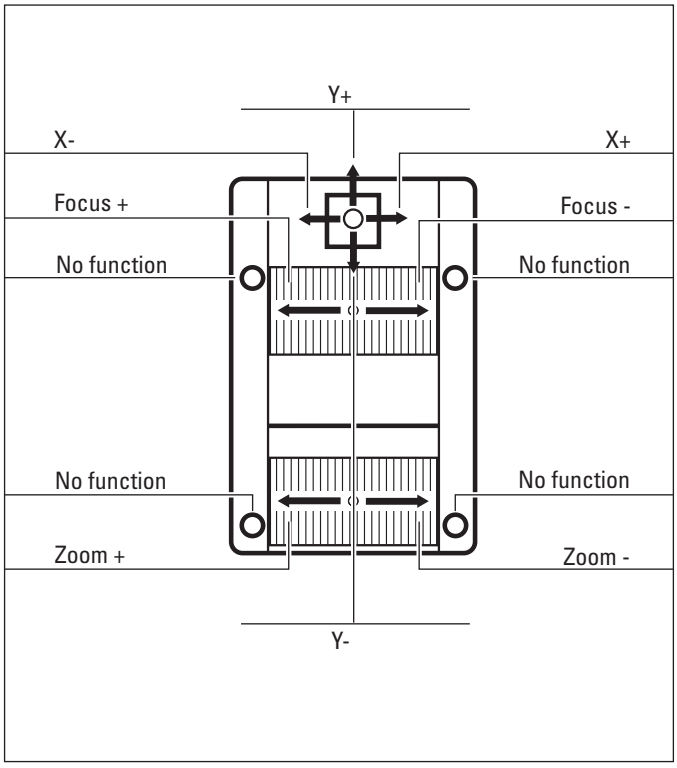


Presets "Cranial"/"Spine"/"ENT"
Here you will find an overview of the assignments of the CAN handles and an optionally connected footswitch for the preset user "Cranial"/"Spine"/"ENT".

You can assign CAN handles and footswitches individually for each user in the configuration menu (see pages 48 and 50).

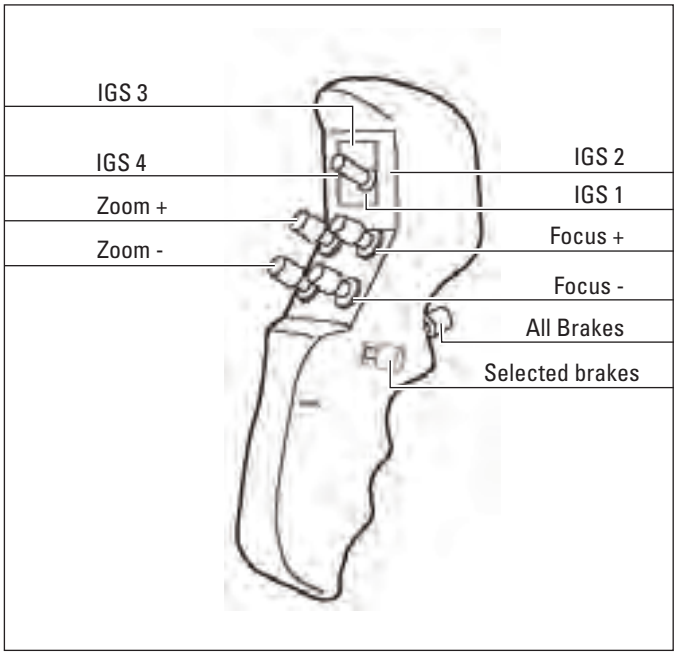


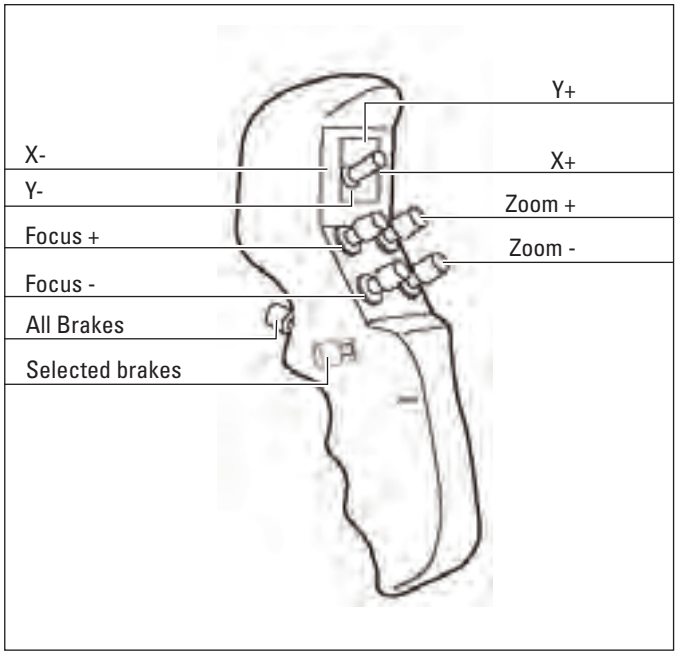


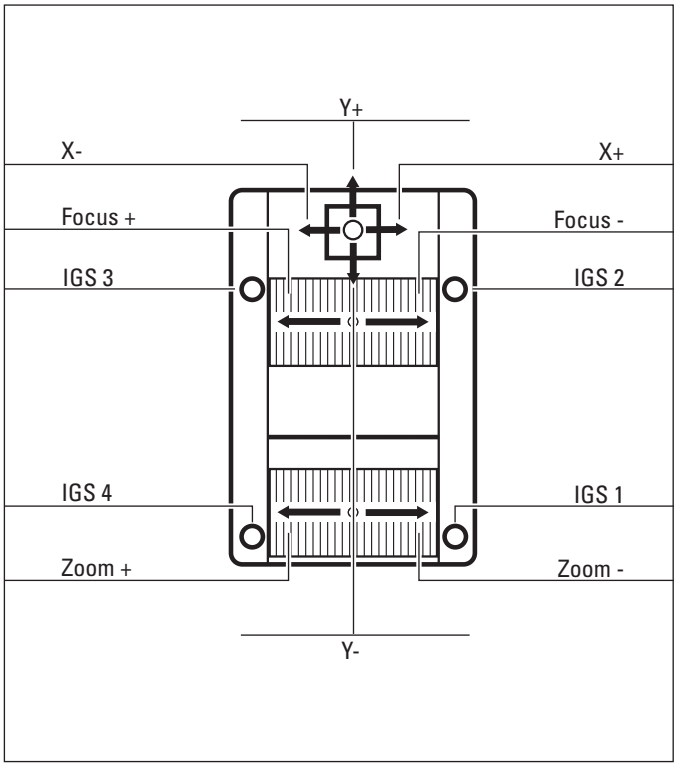


Preset "Image Injection IGS DI C500"
Here you will find an overview of the assignments of the CAN handles and an optionally connected footswitch for the preset user "Image Injection IGS DI C500".

You can assign CAN handles and footswitches individually for each user in the configuration menu (see pages 48 and 50).

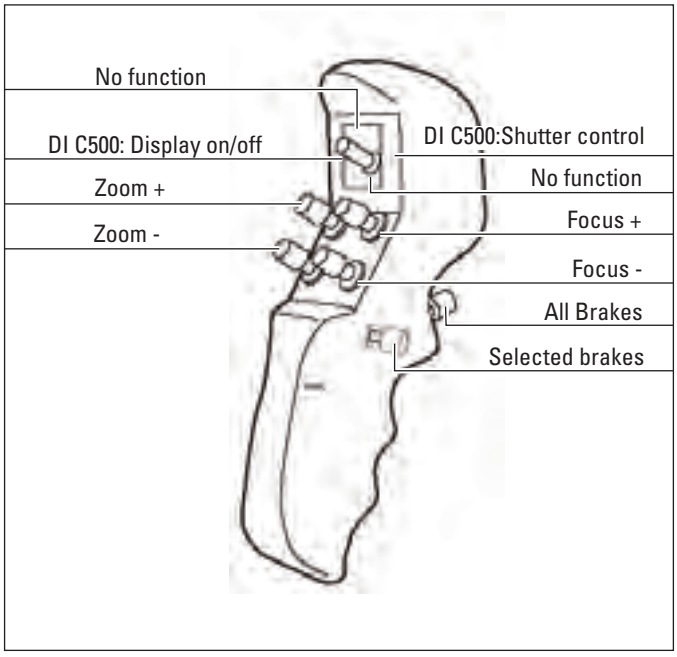


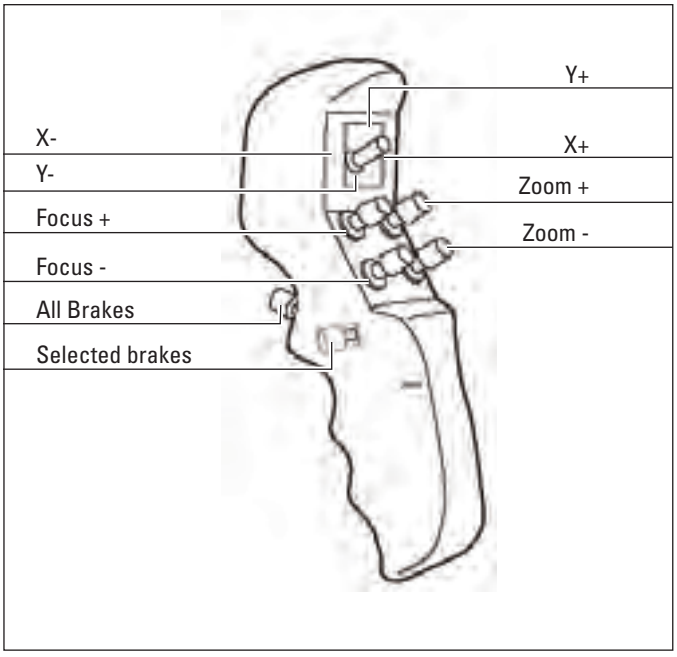


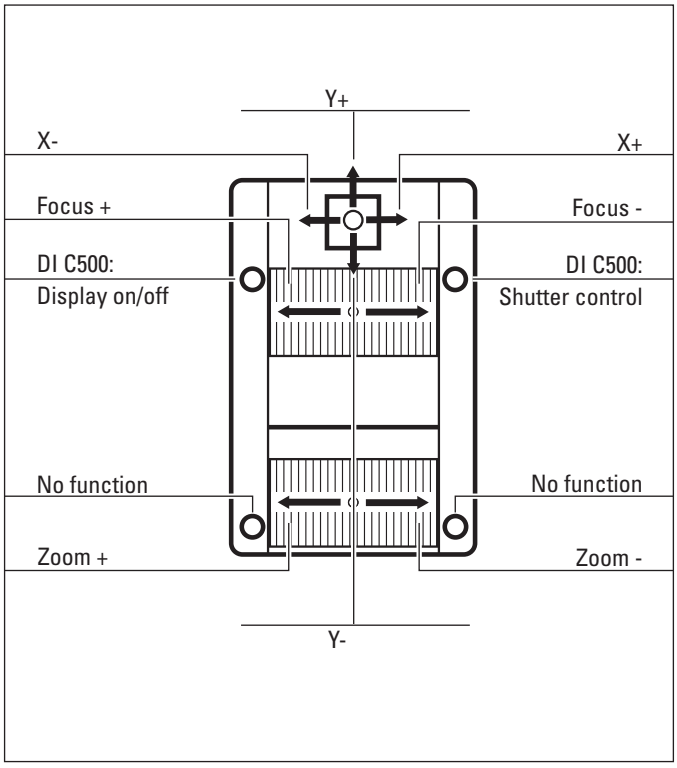


Preset "Image Injection ENDO DI C500"
Here you will find an overview of the assignments of the CAN handles and an optionally connected footswitch for the preset user "Image Injection ENDO DI C500".

You can assign CAN handles and footswitches individually for each user in the configuration menu (see pages 48 and 50).

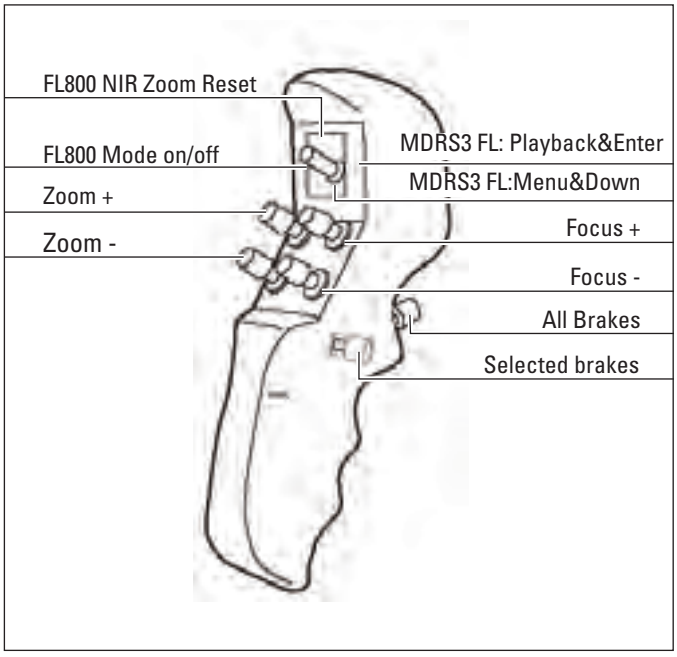


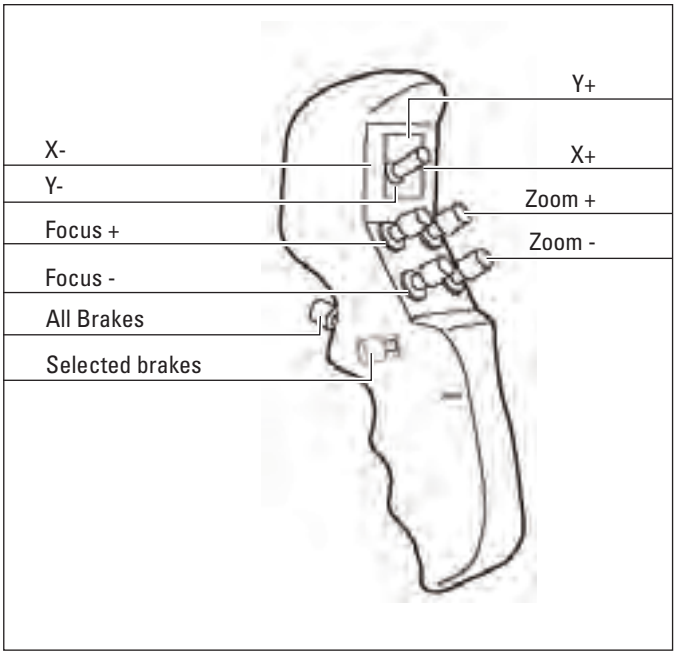


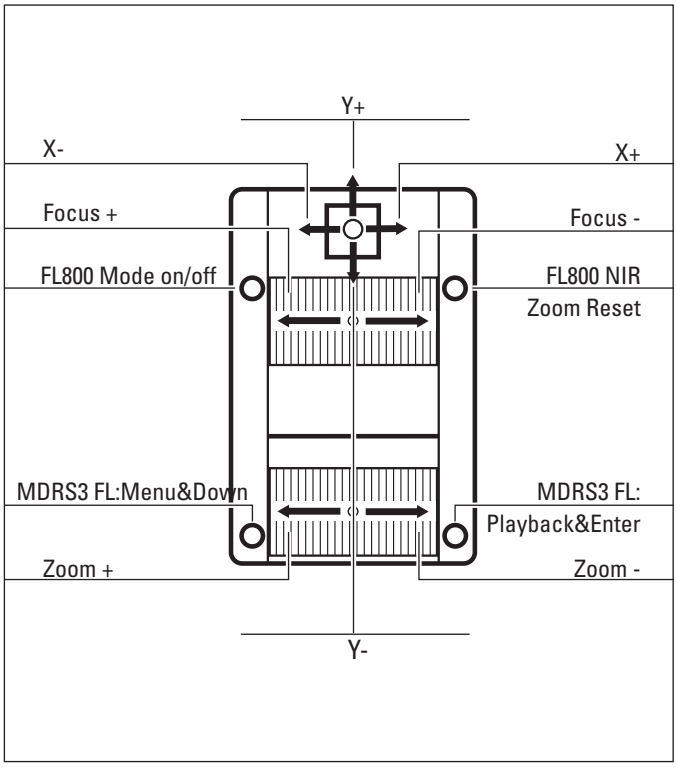


Preset "Fluorescence Vascular FL800"
Here you will find an overview of the assignments of the CAN handles and an optionally connected footswitch for the preset user "Fluorescence Vascular FL800".

☞ You can assign CAN handles and footswitches individually for each user in the configuration menu (see pages 48 and 50).

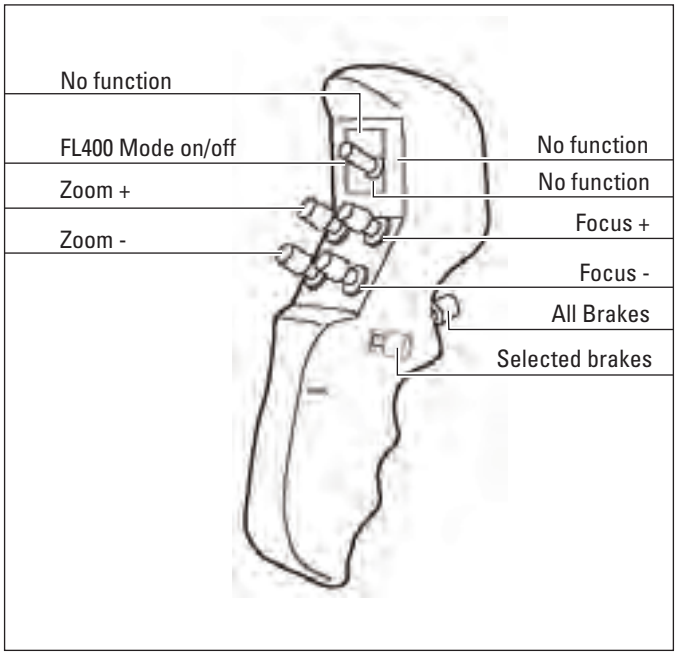


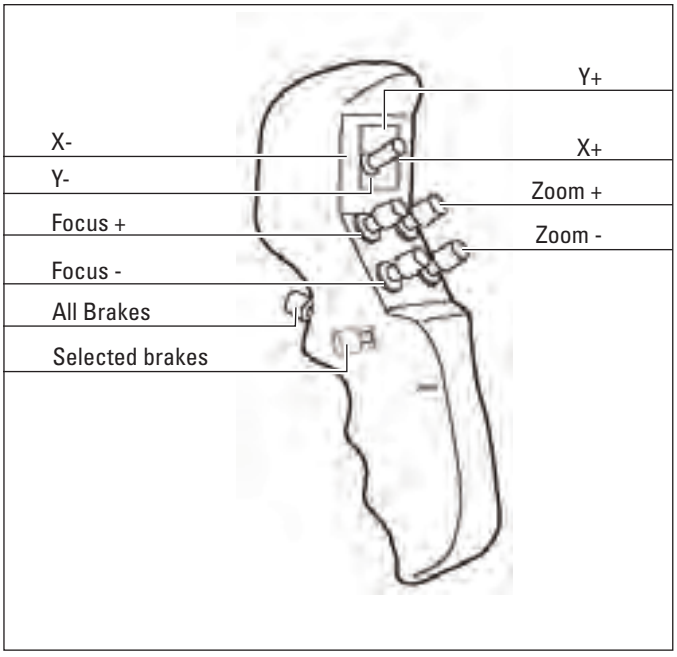


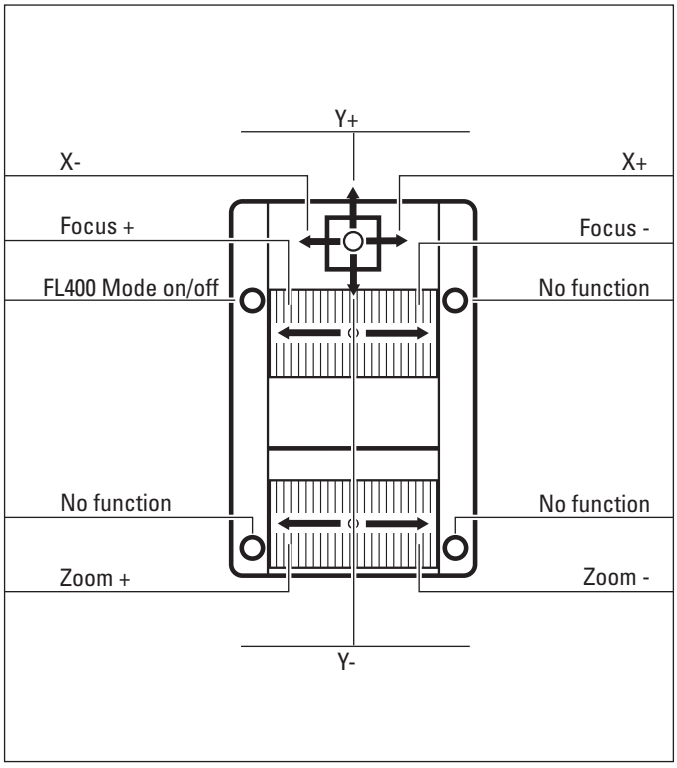


Preset "Fluorescence Oncology FL400"
Here you will find an overview of the assignments of the CAN handles and an optionally connected footswitch for the preset user "Fluorescence Oncology FL400".

You can assign CAN handles and footswitches individually for each user in the configuration menu (see pages 48 and 50).

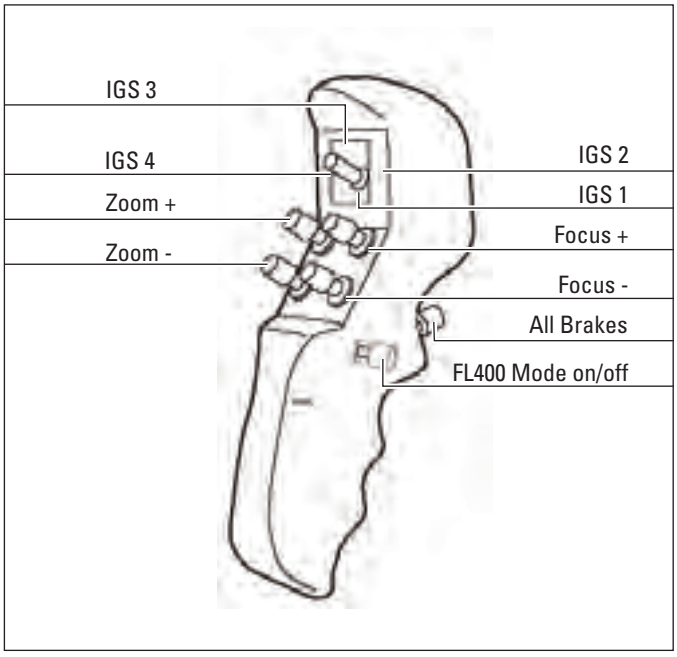


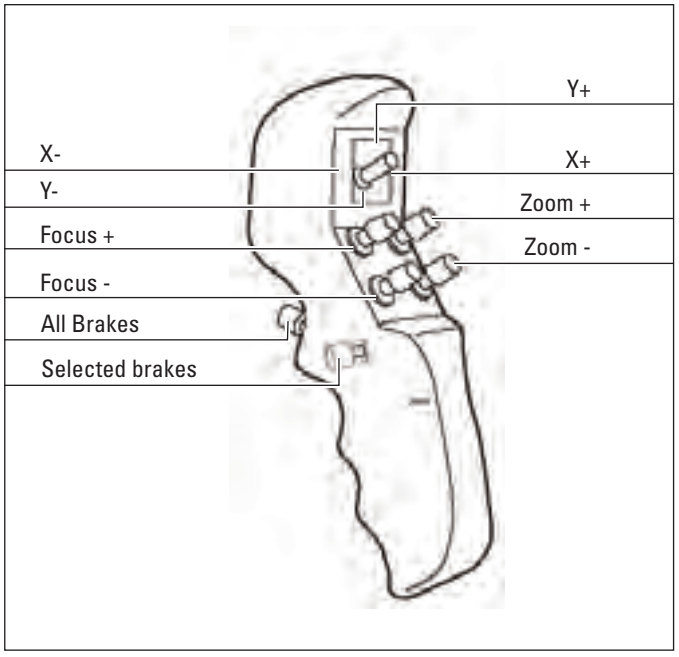


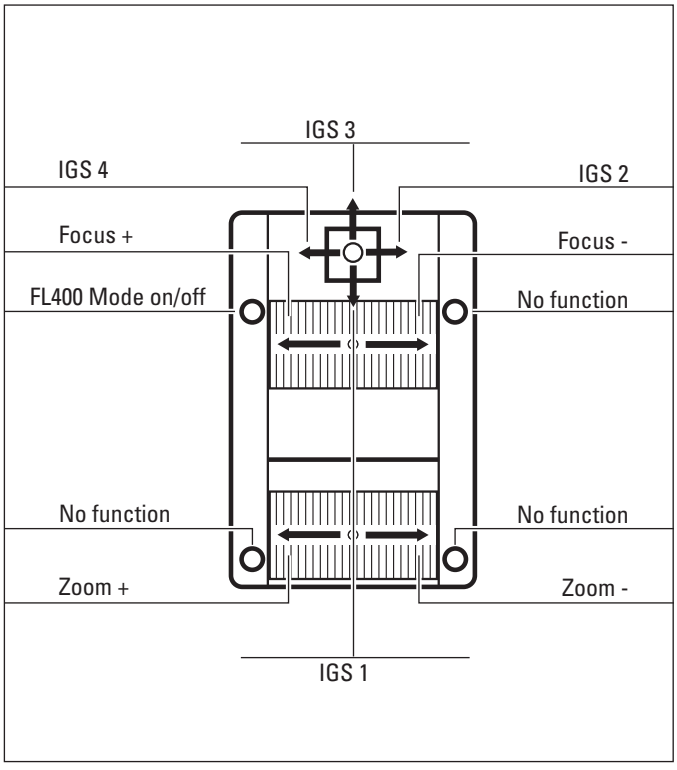


Preset "Fluorescence Oncology FL400 & IGS DI C500"
Here you will find an overview of the assignments of the CAN handles and an optionally connected footswitch for the preset user "Fluorescence Oncology FL400 & IGS DI C500".

You can assign CAN handles and footswitches individually for each user in the configuration menu (see pages 48 and 50).

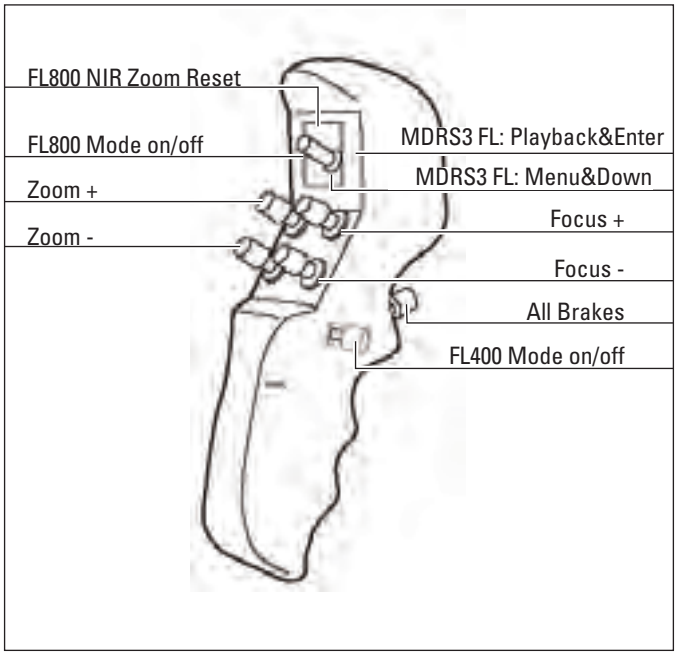


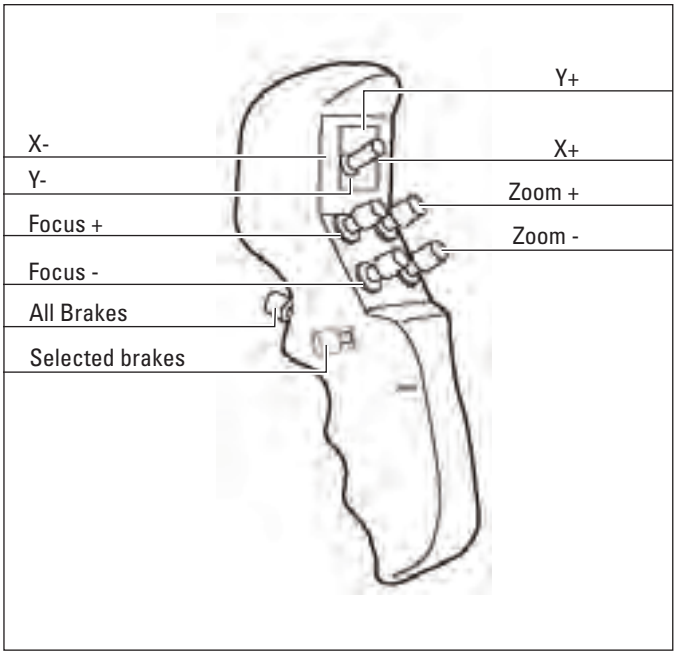


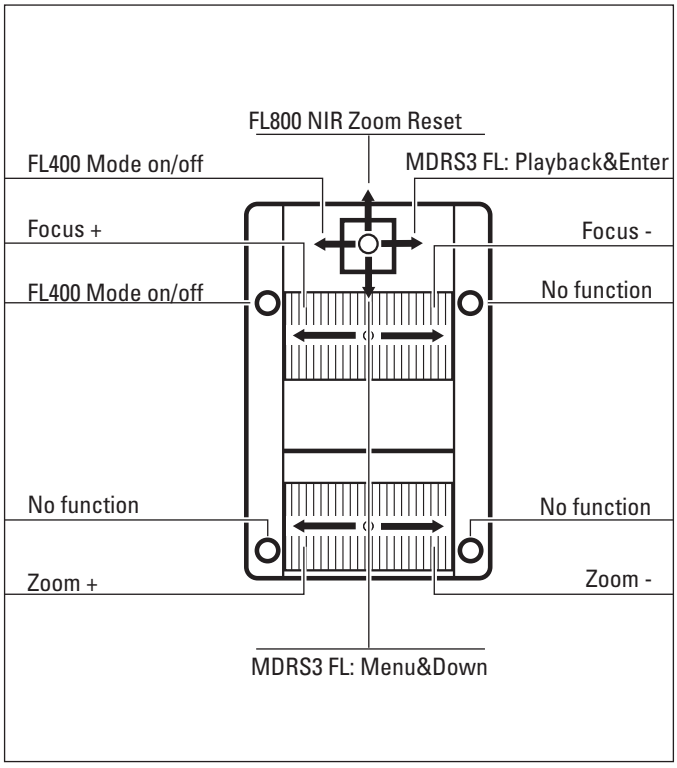


Preset "Fluorescence Oncology FL400 & Vascular FL800"
Here you will find an overview of the assignments of the CAN handles and an optionally connected footswitch for the preset user "Fluorescence Oncology FL400 & Vascular FL800".

You can assign CAN handles and footswitches individually for each user in the configuration menu (see pages 48 and 50).







A comprehensive range of accessories enables the Leica M525 OH4 surgical microscope to be matched to the requirements of the task in hand. Your Leica representative will be pleased to help you select the appropriate accessories.

Beam splitter

- Can be used for co-observation or documentation
  Light distribution: 50% on each side (mono) or 30% / 70%

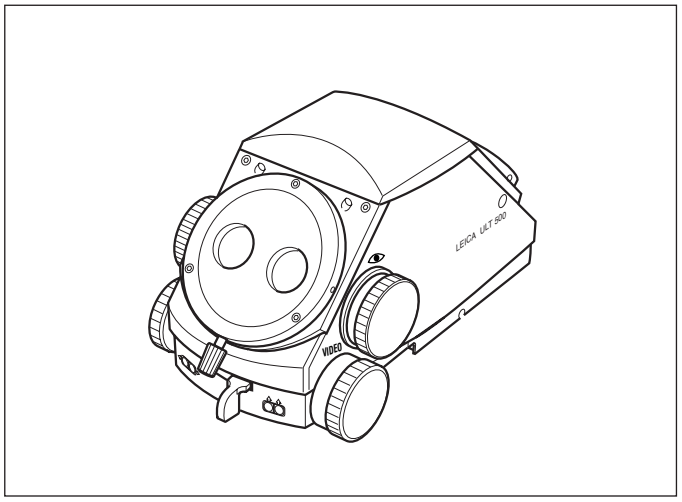
Beam splitter with counterweight

- Can be used for co-observation or documentation
  Light distribution: 50% on each side (mono)

180° second observer attachment

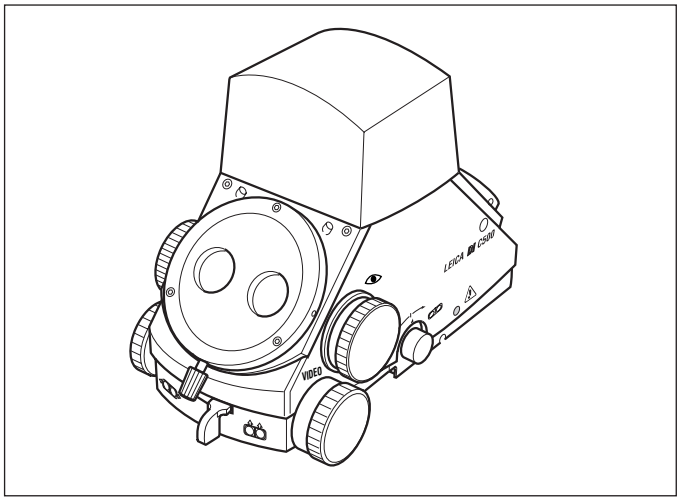
- Allows a second observer to view the procedure

Ultra Observer Leica ULT500



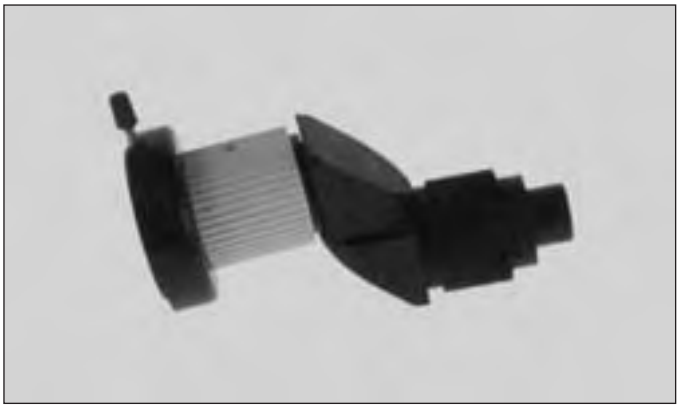
- Beam splitter with eight optical ports
- Light distribution:
  Surgeon (front) 40% (stereo)
  Assistant (rear) 40% (stereo) or
  Assistant (side) 40% (mono)
  Documentation (side) 20%

Dual Imaging Color Module Leica DI C500



- Beam splitter with eight optical ports
- Integrated color display shows data or video images.
- Light distribution:
  Surgeon (front) 40% (stereo)
  Assistant (rear) 40% (stereo) or
  Assistant (side) 40% (mono)
  Documentation (side) 20%

Stereo attachment for second observer



- Is attached to the side outputs of a beam splitter.

Tubes

Binocular tube variable from 30°–150°

- Variable viewing angles from 30° to 150°
- Adjustable viewing height
- Adjustable interpupillary distance

Binocular tube variable from 0°–180°

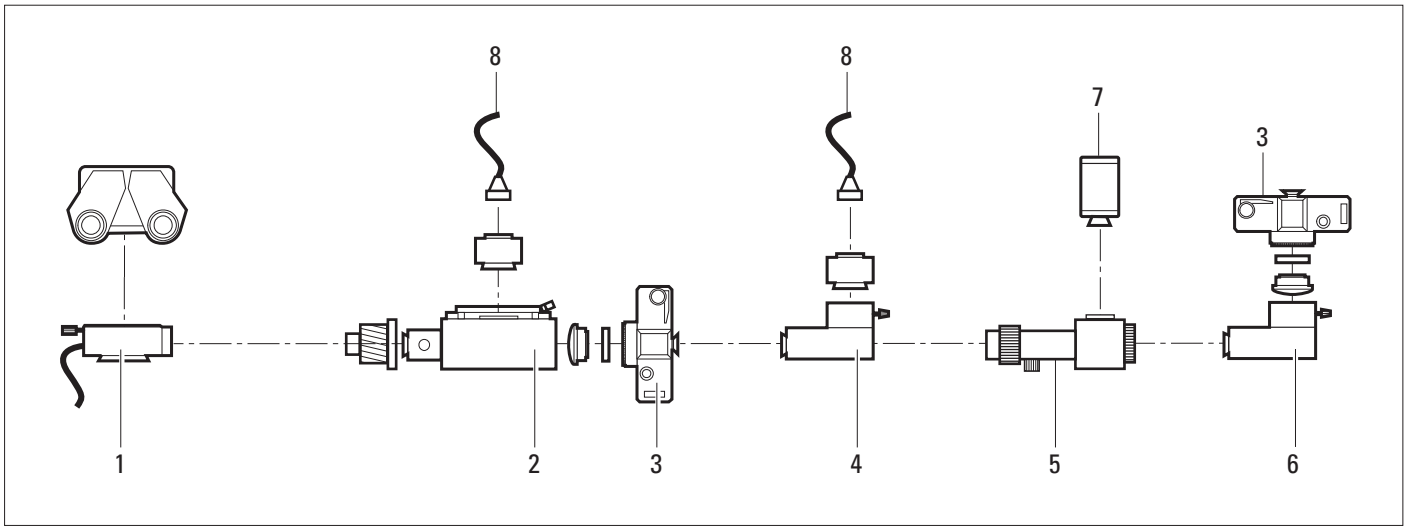
- Variable viewing angles from 0° to 180°

Inclined binocular tube

Straight binocular tube

Inclined binocular tube 45°

Video and photo accessories for Leica M525



1 Leica 2D Pick up
2 Photo/TV dual attachment
3 Photo camera
4 TV attachment
5 Zoom Video Adapter
6 Phototube
7 Video camera (such as the Leica D2D V3)
8 Leica 2D C-Mount

Leica 2D pick-up
- Video system for recording 2D video sequences.

Leica 2D C-Mount
- Video system for recording 2D video sequences.
- The camera (8) is mounted on the TV attachment or Zoom Video Adapter.

Photo/TV dual attachment
- For using a video camera with C-mount at the same time as an SLR camera.
  Complete with adapters.
- Position of video camera engageable in 45° increments.
- Video port with incorporated brightness adjustment (3 positions).

TV attachment
- For commercially-available video cameras with C-mount, complete with adapter.
- The TV attachment (4) is installed at the documentation port of the 0° assistant's attachment.
- Position of video camera engageable in 90° increments.

Zoom Video Adapter
- For commercially-available video cameras with C-mount, complete with adapter.
- The Zoom Video Adapter (5) is installed at the documentation port of the 0° assistant's attachment.
- Zoom and fine focus function for Leica Zoom Video Adapter

Phototube
- Complete with adapter, for SLR cameras.
- Adapter f = 250mm: for large fields of view and short exposure times.
- Adapter f = 350mm: for high magnifications.
- The phototube (6) is mounted on the documentation port of the 0° assistant's attachment.

Checklist: Before the operation

Cleaning the optical accessories
⇨Check the tubes, eyepieces and the documentation accessories (if used) for cleanliness.
⇨Remove dust and dirt (see page 68).

Installing accessories
⇨Lock the Leica M525 OH4 in place and install all accessories on the microscope so it is ready for use (see page 22).
⇨Position the CAN handles as required.
⇨Connect a mouth switch and/or footswitch (if used).
⇨Check the camera image on the monitor and realign if necessary.

Checking tube settings
⇨Check the tube and eyepiece setting for the selected user (see page 24).
⇨Treat the eyepieces with an antifogging compound if necessary.

Balancing
⇨Balancing the Leica M525 OH4 (see page 27).
⇨Press the "All Brakes" button on the CAN handle and check the balancing.

Function check

Warning 1
Danger of fatal electrical shock.
⇨The Leica M525 OH4 surgical microscope may be connected to a grounded socket only.

⇨Connect the power cable.
⇨Switch on the microscope.
⇨Switch on the illumination at the control unit.

Leave the illumination on for at least 5 minutes, as otherwise luminosity will decrease rapidly.

⇨Replace defective bulbs before the operation begins.
⇨Test all functions on the CAN handles and on the footswitch.
⇨Check the user settings on the control unit for the selected user (see page 45).

Positioning at the OP table
⇨Position the surgical microscope on the OP table as required, and lock the footbrake (see page 35).

Sterility
⇨Fit sterile components and sterile drape if used (see page 36).

Warning 2
Danger of fatal electric shock
⇨Operate the system only with all equipment in its proper position (all covers fitted, doors closed).

Installing optical accessories

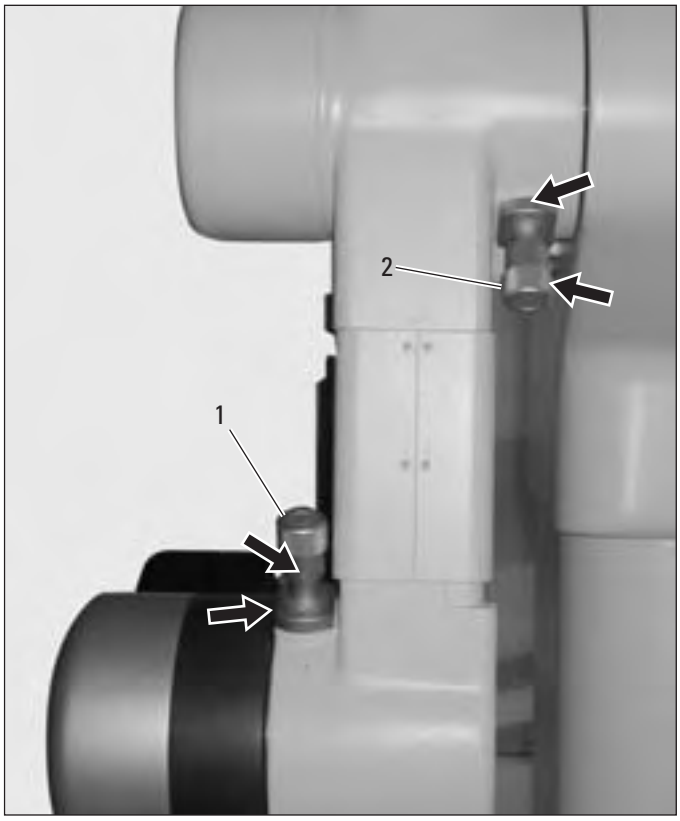
Warning 3
Risk of injury through surgical microscope moving down!

⇨Complete all preparations and adjustments to the stand before the operation.
⇨Never balance or re-equip the instrument over the field of operation.
⇨Always lock the Leica M525 OH4 in position before re-equipping it.
⇨Balance the Leica M525 OH4 after re-equipping it.
⇨Do not release the brakes when the instrument is in an unbalanced state.

Locking the Leica M525 OH4 in position

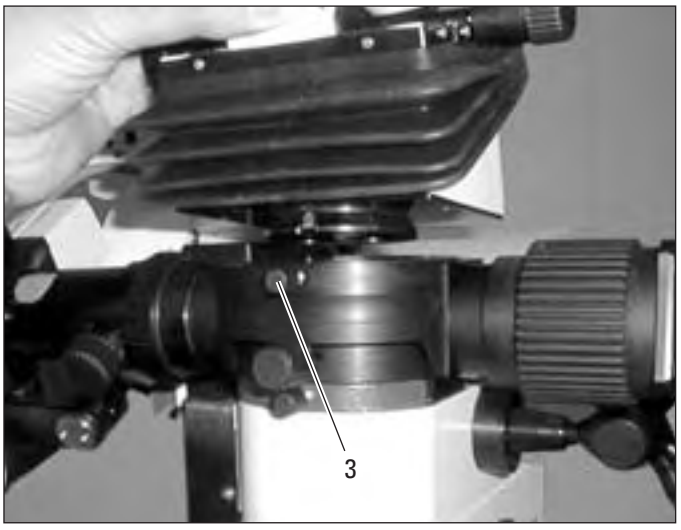
The D-axis of the Leica M525 OH4 is locked in position with the locking device.
The locking device is principally for installation and re-equipping the Leica M525 OH4.

⇨Pull out the locking buttons (1 and 2) and turn them until the two points (arrows) are aligned above each another.



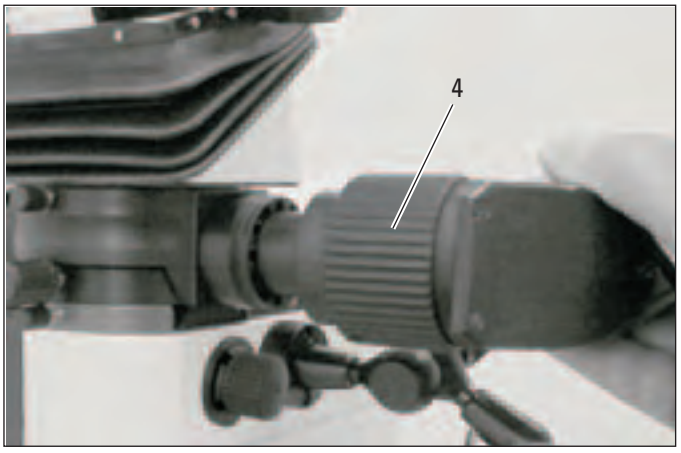
⇨Move the swing arm up and down until locking device (1) engages.
⇨Move the swing arm back and forth until locking device (2) engages.

Installing the 90° stereo attachment, binocular tube and beam splitter



⇨Release the clamping screw (3).
⇨Insert the accessories into the dovetail ring from above.
⇨Tighten the clamping screw (3).

Installing the stereo attachment for second observer

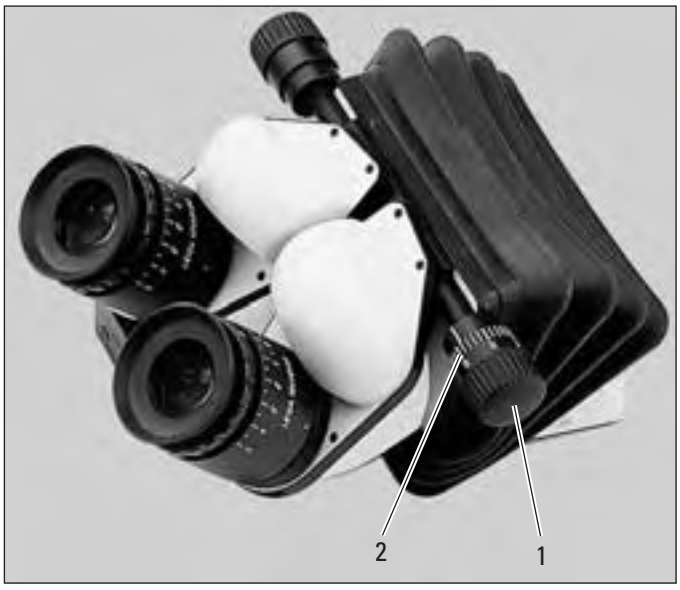


⇨Insert the stereo attachment and check whether the connection has engaged.
⇨Tighten the locknut (4) by hand.
⇨Align the attachment for second observer as required.

Setting the tube

Set the interpupillary distance

Adjust the interpupillary distance to a value between 55mm and 75mm.

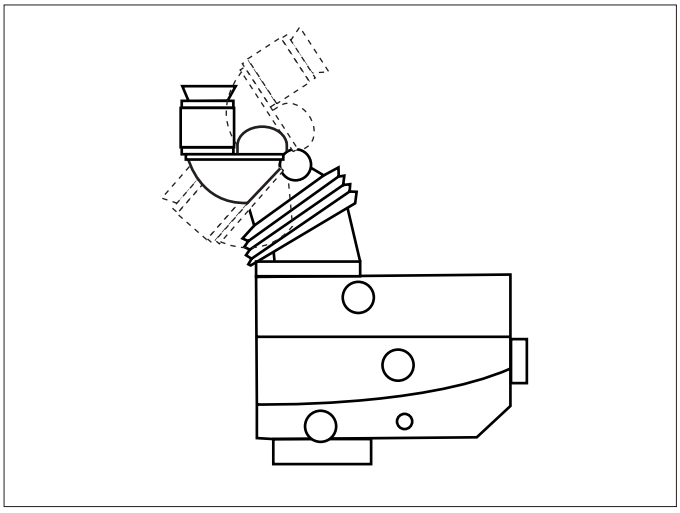


⇨Using the adjusting wheel (1), set the interpupillary distance such that a circular image field can be seen.

This procedure has to be performed only once for each user. The acquired value (2) can be stored for each user on the "User Settings" menu screen under "Tube Settings" (see page 51).

Adjusting the tilt

⇨Hold the tube with both hands.
⇨Tilt the tube up or down.



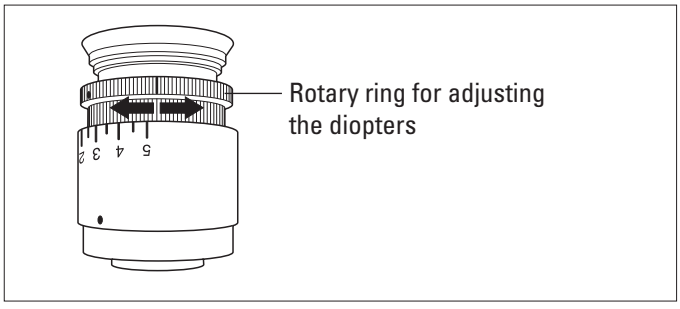
Setting the eyepiece

Determine/set the diopters for the user

The individual diopters can be adjusted continuously for each eyepiece from +5 to -5. Only this method will ensure that the image will stay in focus within the entire zoom range = parfocal. The treatment microscope ensures a high degree of fatigue resistance when the diopter setting is correct for both eyes.

A parfocal adjusted microscope ensures that the assistant´s view and monitor image will always remain sharp.

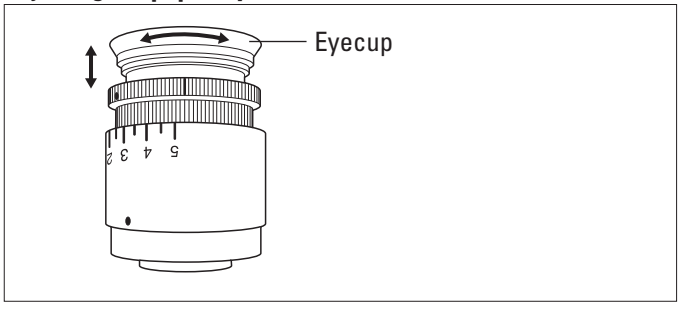
⇨Set to the minimum magnification.
⇨Place a flat test object with sharp contours under the lens at working distance.
⇨Focus the microscope.
⇨Set to the maximum magnification.
⇨Focus the microscope.
⇨Set to the minimum magnification



⇨Without looking into the eyepieces, turn both eye lenses to +5 diopters.
⇨Slowly turn the eyepieces towards -5 individually for each eye until the test object appears sharp.
⇨Select the highest magnification and check the sharpness.

This procedure has to be performed only once for each user. The acquired values can be stored for each user on the "User Settings" menu screen under "Tube Settings" (see page 51).

Adjusting the pupillary distance



⇨Rotate the eyecups up or down until the desired distance is set.

Checking parfocality

⇨Place a flat test object with sharp contours under the lens at working distance.
⇨Zoom through the whole range, observing the test object.
The image sharpness must remain constant at all magnifications. If this is not the case, check diopter settings of the eyepieces.

Installing documentation accessories

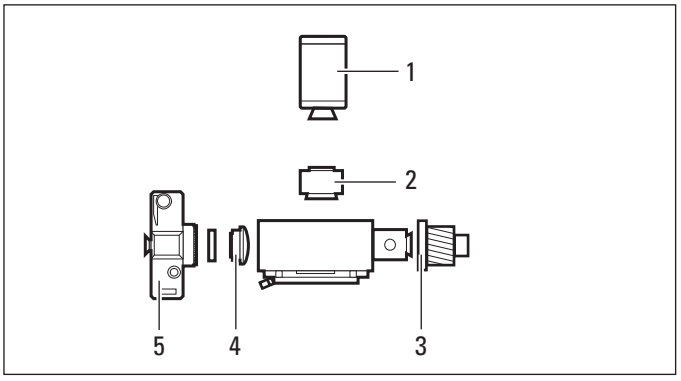
Fitting the Leica 2D

See user manual Leica 2D (10708979).

Fitting the photo/TV dual attachment

⇨Install the dual attachment on the beam splitter.
⇨Equip the video camera (1) with the TV objective (2) and insert into the dual attachment.
⇨Tighten the clamping screw.
⇨Loosen the clamping screw and engage the video camera until it engages in one of the 45° increments depending on the available space.
⇨Tighten the clamping screw.

⇨Equip the photo camera (5) with camera adapter (4).
⇨Screw the photo lens onto the camera adapter (4).
⇨Fit the camera to the dual attachment.
⇨Tighten the clamping screw.



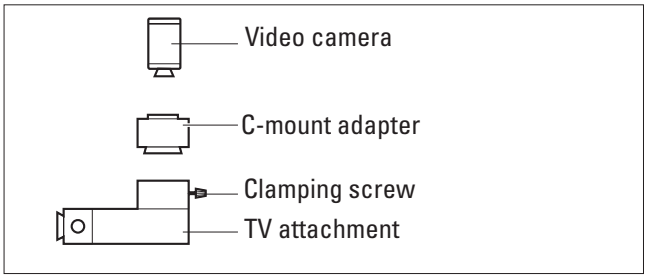
1 Video camera
2 TV lens
3 Adapter M600 to M500 interface
4 Camera adapter
5 Photo camera and photo lens

The object image at the camera output is laterally reversed!

Using the dial, the brightness of the video can be adjusted to 30%, 50% or 100%. One of these filters can be switched with the 8% filter provided. To do so, remove the camera and change the filter in the TV output.

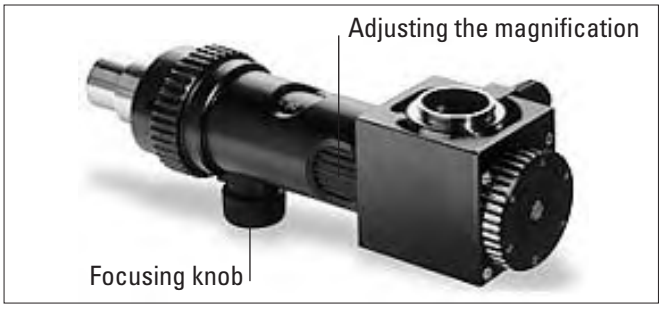
TV attachment / zoom video adapter

⇨Mount the TV attachment on the documentation port of the beam splitter.
⇨Screw the adapter to the camera using the C-mount.
⇨Insert the camera with the adapter into the TV attachment and tighten the clamping screw.



90° click-stop (TV attachment only):
⇨Loosen the clamping screw.
⇨Engage the camera at one of the 90° increments in accordance with the space available and tighten the clamping screw.

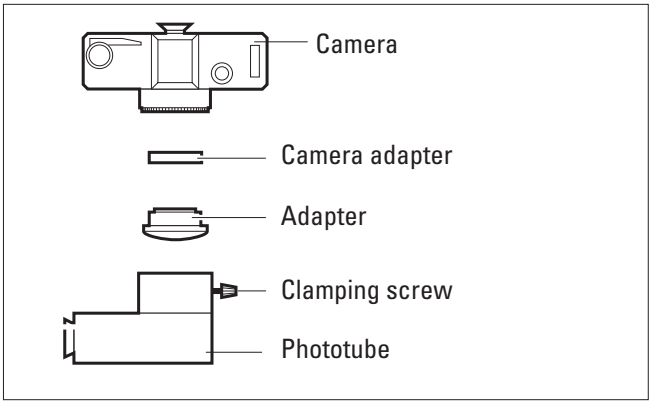
Setting the Zoom Video Adapter parfocal:
⇨Set to the maximum magnification.
⇨Place a flat test object with sharp contours under the objective.
⇨Look through the eyepieces and focus the microscope.
⇨Set to the minimum magnification.
⇨Set the maximum magnification (f=100) on the Zoom Video Adapter.
⇨Focus the monitor image on the Zoom Video Adapter.



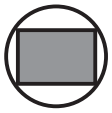
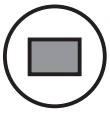
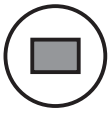
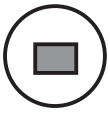
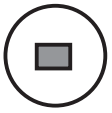
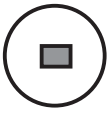
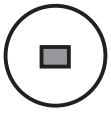
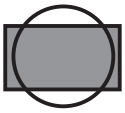
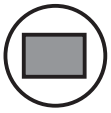
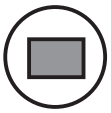
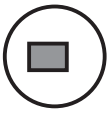
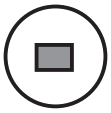
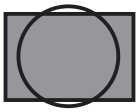
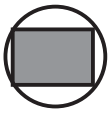
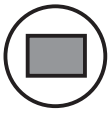
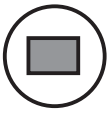
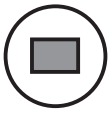
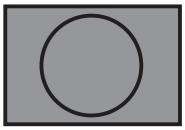
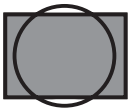
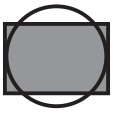
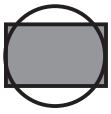
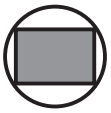
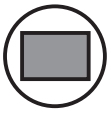
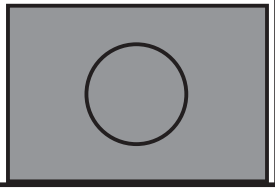
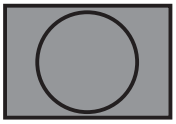
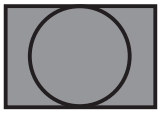
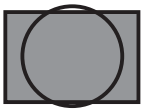
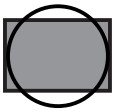
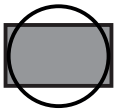
⇨Set the desired magnification on the Zoom Video Adapter.

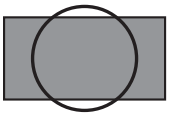
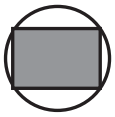
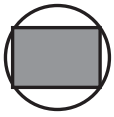
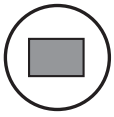
Fitting the phototube

⇨Mount the phototube on the beam splitter.
⇨Secure the camera adapter to the SLR camera.
⇨Connect the f = 250mm or f = 350mm adapter to the camera adapter.
⇨Secure the camera, complete with adapter, in the phototube.
⇨Tighten the clamping screw.



Selecting documentation accessories

	Zoom video adapter 35mm	TV attachment 55mm	PhotoTV dual attachment 60mm	TV attachment 70mm	PhotoTV dual attachment 85mm	Zoom video Adapter 100mm	TV attachment 107mm
1/4 "							
1/3 "							
1/2 "							
2/3 "							
1 "							

	Photo/TV dual attachment 250 mm	350 mm
35 mm		
Digital Photo Camera		

Field of view

Monitor/image

Stand settings

Automatic balancing of the Leica M525 OH4

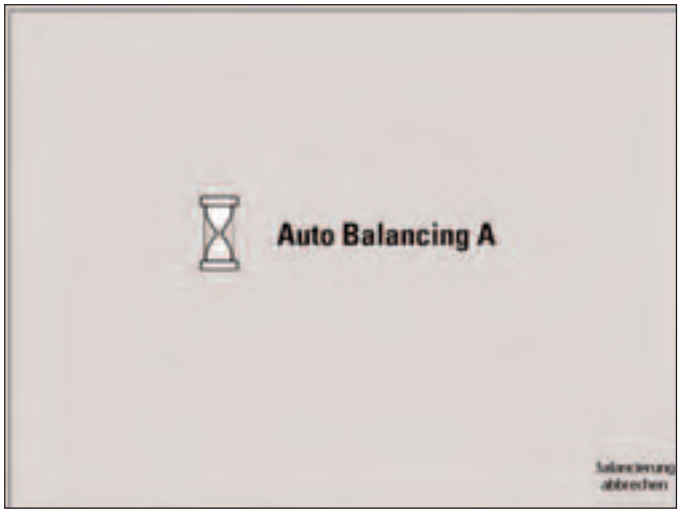
Warning 5
Danger of injury due to movement of the microscope during the balancing process.
⇨Do not stand next to the microscope during the balancing process.

Warning 6
Danger of injury due to the Leica M525 OH4 surgical microscope moving down.
⇨Never balance or re-equip the instrument over the field of operation.
⇨Balance the Leica M525 OH4 surgical microscope after re-equipping it.
⇨Do not release the brakes when the instrument is in an unbalanced state.
⇨Never perform intraoperative AC / BC balancing over the patient.

⇨Switch on the Leica M525 OH4.
⇨Install the accessories in the permitted weight range (see Technical data, screen 80).
⇨Align the accessories in the working position.
⇨Press the "All Brakes" button on the CAN handle and move the optical carrier into the A-position.
The mark (1) musty be pointing to A.

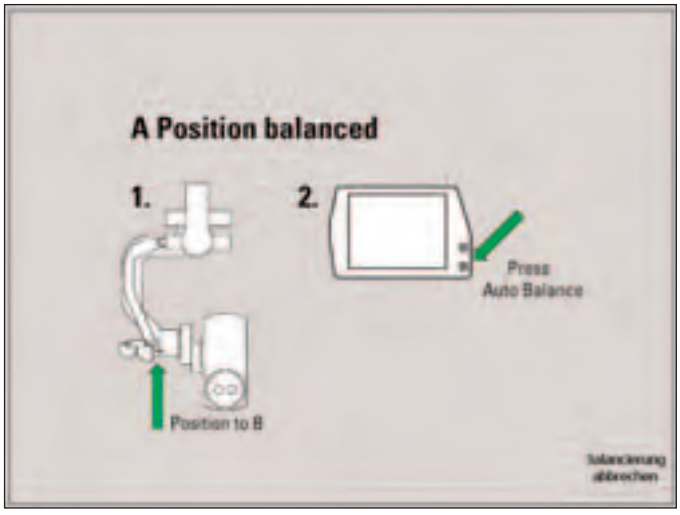
⇨Press the autobalancing push-button (3) on the control unit.
During the balancing procedure, the push-button (2) flashes green and an acoustic signal sounds (can be deactivated in the service menu).

The following dialog window opens on the touch panel monitor:

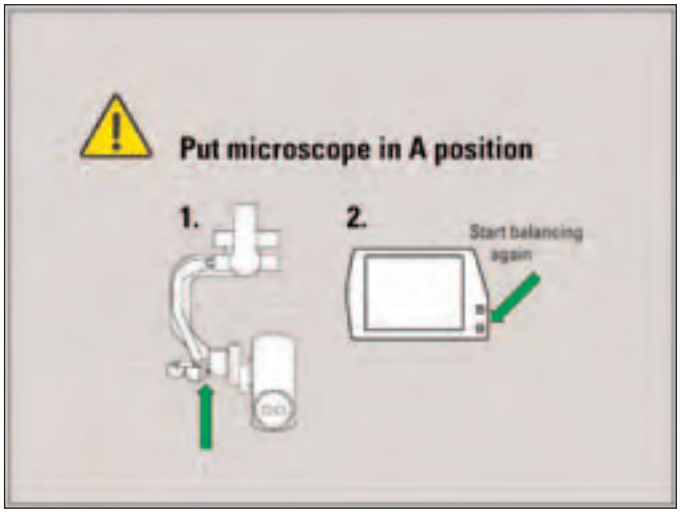


The balancing procedure can be canceled at any time using "Interrupt Balancing".

The first balancing step is complete when the acoustic signal no longer sounds and the push-button (2) is no longer flashing.

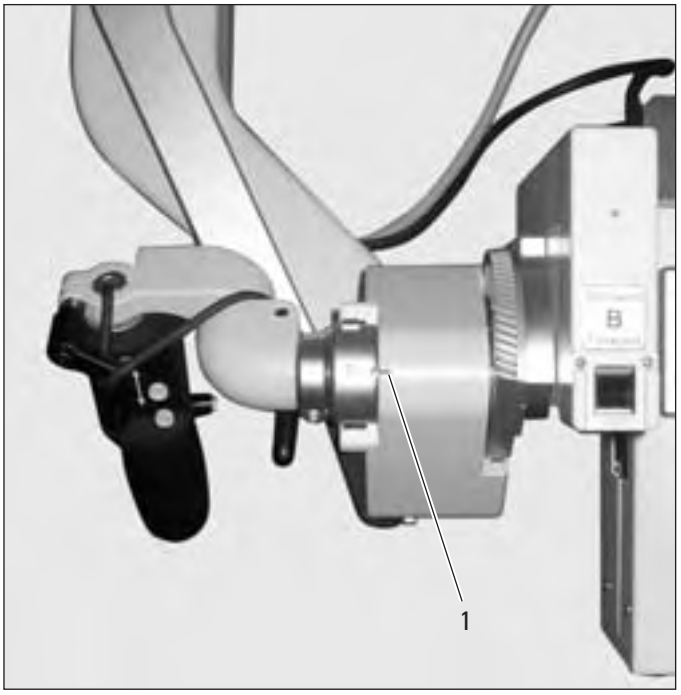


If automatic balancing cannot be successfully completed, the following dialog window opens:



⇨Acknowledge with the "Close" button.
⇨Correct the alignment of the optical carrier (A-position).
⇨Press push-button (2).
Autobalancing re-starts.

⇨Press the "All Brakes" button on the CAN handle, tilt the optical carrier forwards 90° and move it into the B-position. The mark (1) must be pointing towards B.



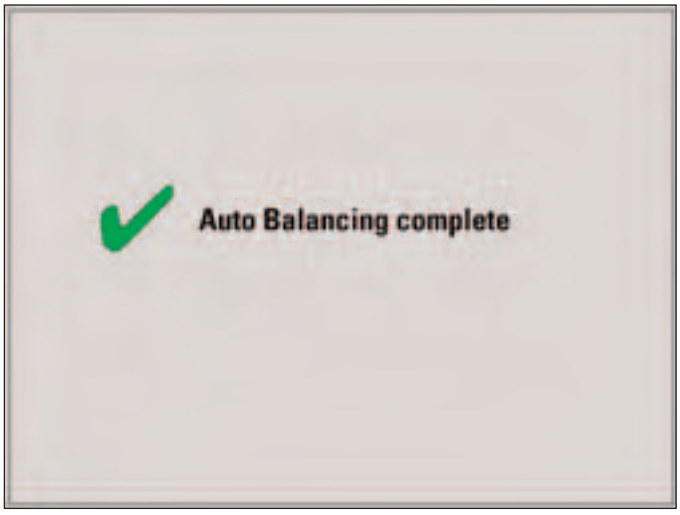
If the mounted accessories (e. g. the assistant's tube) do not allow a 90° tilt movement, turn the tube upwards, tilt the optical carrier forwards and move the tube back into its working position.

⇨Press the autobalancing push-button (2) on the control unit again.
During the balancing procedure, the push-button (2) flashes yellow and an acoustic signal sounds (can be deactivated in the service menu).

⇨The following dialog window opens on the touch panel:

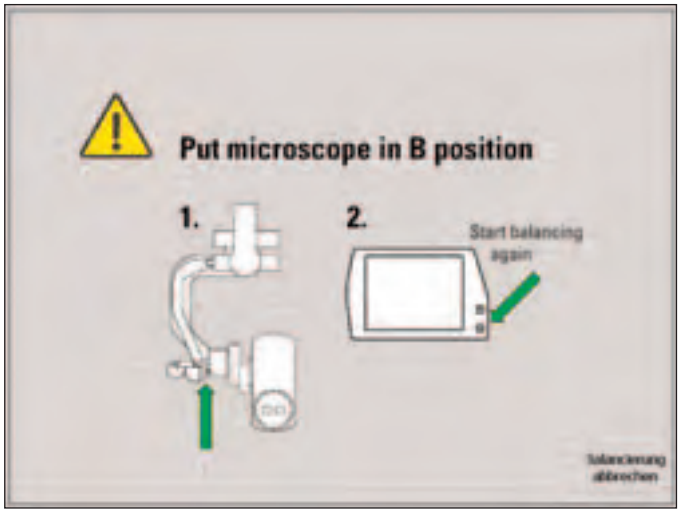
☞ The balancing procedure can be canceled at any time using "Interrupt Balancing".

⇨Balancing is complete when the acoustic signal no longer sounds and the push-button (2) is no longer flashing.
A dialog window indicates that balancing has been completed.



⇨Press the "Close" button or wait until the dialog window is closed automatically after 5 seconds.
⇨Check the balancing.
⇨Press the "All Brakes" button on the CAN handle and position the microscope.
The microscope must remain fixed in any position.

If automatic balancing cannot be successfully completed, the following dialog window opens:



⇨Acknowledge with the "Close" button.
⇨Correct the alignment of the optical carrier (B-position).
⇨Press the push-button (2).
Autobalancing re-starts.

Intraoperative balancing

Warning 4
Danger of injury due to movement of the microscope during the balancing process.
⇨Do not stand next to the microscope during the balancing process.

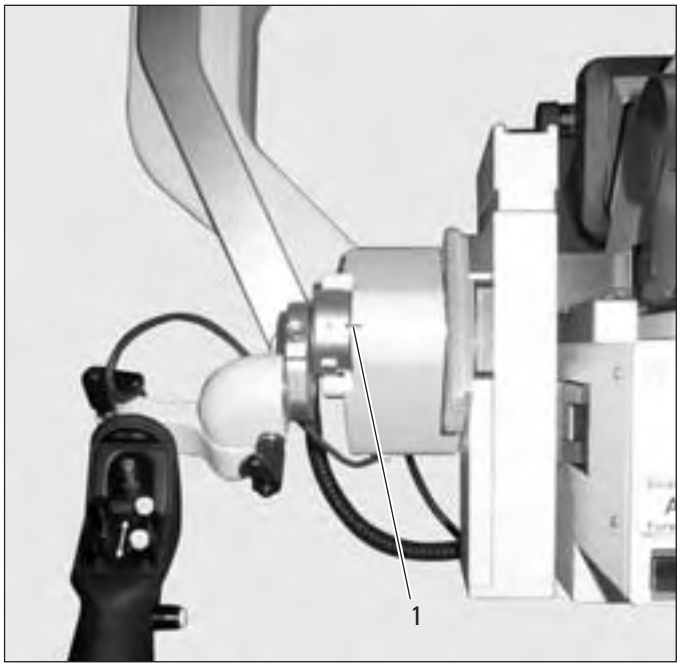
Warning 5
Danger of injury due to swinging down of the Leica M525 OH4 surgical microscope.
⇨Never balance or re-equip the instrument over the field of operation.
⇨Balance the Leica M525 OH4 surgical microscope after re-equipping it.
⇨Do not release the brakes when the instrument is in an unbalanced state.

Intraoperative AC/BC balancing allows re-balancing during the operation. Re-balancing may be necessary if, for instance, an assistant's tube is adjusted.
Either axes A and C or B and C can be balanced.

For best results, it is recommended to balance axes A and C before balancing axes B and C.

A/C balancing

If work is performed only in the horizontal microscope position, re-balancing of the A/C axes may be sufficient.
⇨Press the "All Brakes" button on the CAN handle and move the optical carrier into the A-position.
The mark (2) must be pointing towards A.

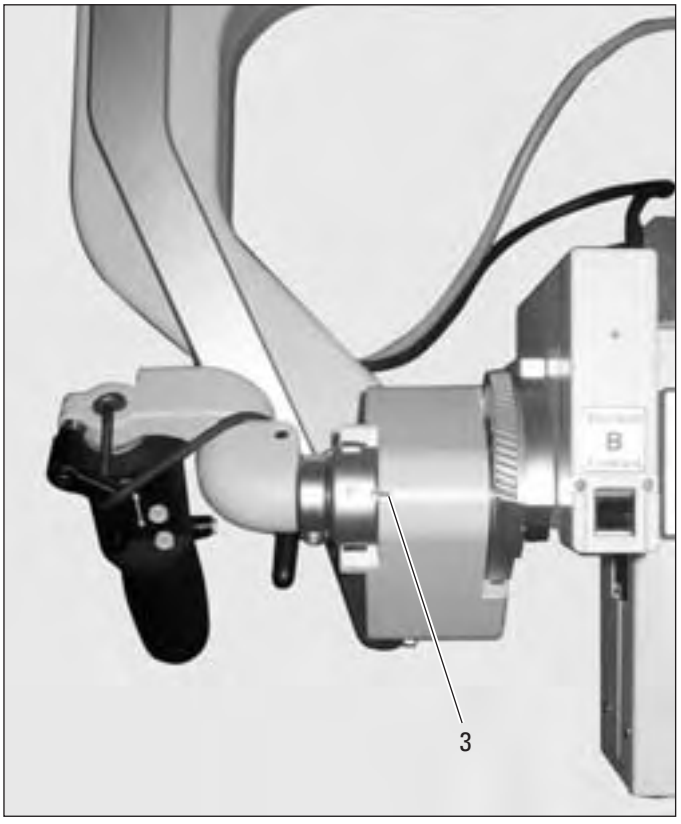


⇨Press the start button for automatic AC/BC balancing on the swing arm.
During the balancing procedure, the push-button (2) on the control unit flashes green and an acoustic signal sounds.

The A-axis is balanced first, followed by the C-axis.

B/C balancing

If work is performed only in the upright microscope position, re-balancing of the B/C axes may be sufficient.
⇨Press the "All Brakes" button on the CAN handle and move the optical carrier into the B-position.
The mark (3) must be pointing towards B.



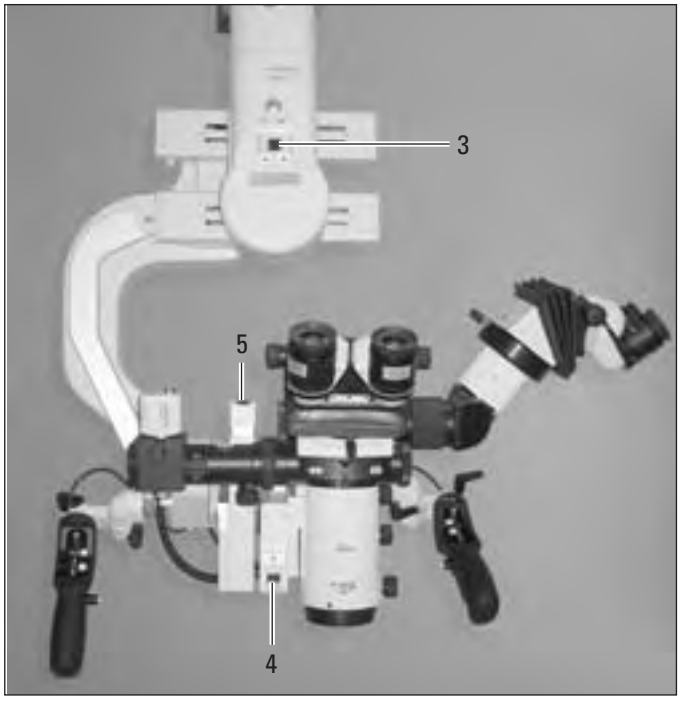
⇨Press the start button (1) for automatic AC/BC balancing on the swing arm.

During the balancing procedure, the push-button (2) on the control unit flashes yellow and an acoustic signal sounds.

The B-axis is balanced first, followed by the C-axis.
⇨Check the balancing.
⇨Press the "All Brakes" button on the CAN handle and position the microscope.
The microscope must remain fixed in any position.
⇨Correct the balancing, if necessary.

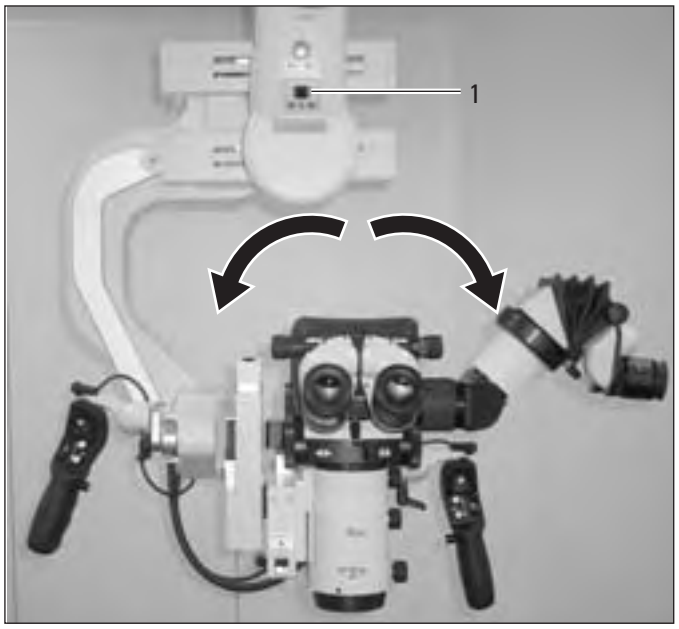
Correcting the balancing manually

For manual balancing, the axes can be moved manually using switches (3), (4) and (5).



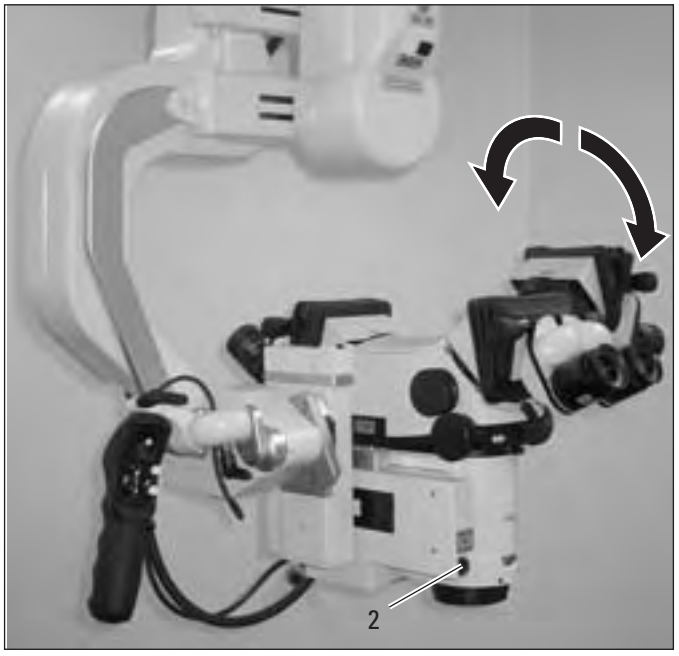
Make sure that no accessories collide with the microscope during manual balancing.

⇨Check the balancing.
⇨Press the "All Brakes" button on the CAN handle.



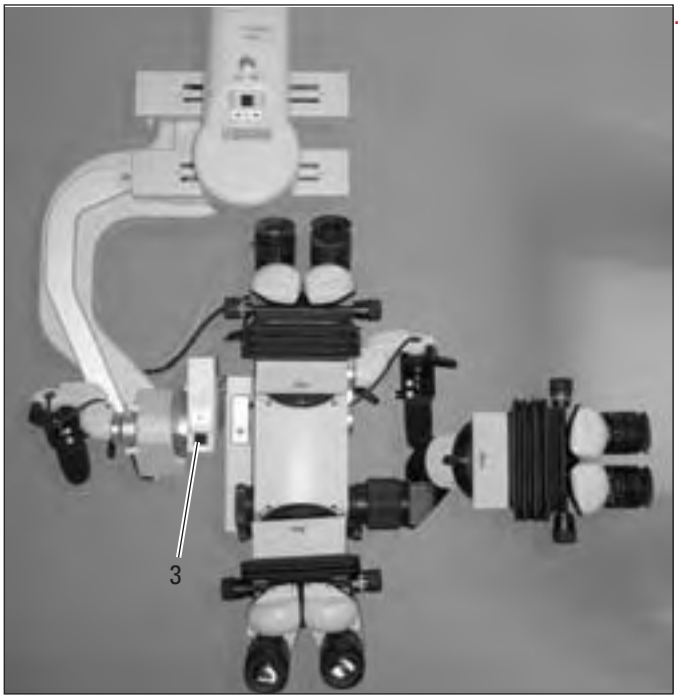
The optical carrier tilts to the right:
⇨Move the C-axis to the left with switch (1) until the optical carrier is balanced.

The optical carrier tilts to the left:
⇨Move the C-axis to the right with switch (1) until the optical carrier is balanced.



The optical carrier (in the A-position) tilts back:
⇨Move the A-axis forwards with switch (2) until the optical carrier is balanced.

The optical carrier tilts forwards:
⇨Move the A-axis back with switch (2) until the optical carrier is balanced.



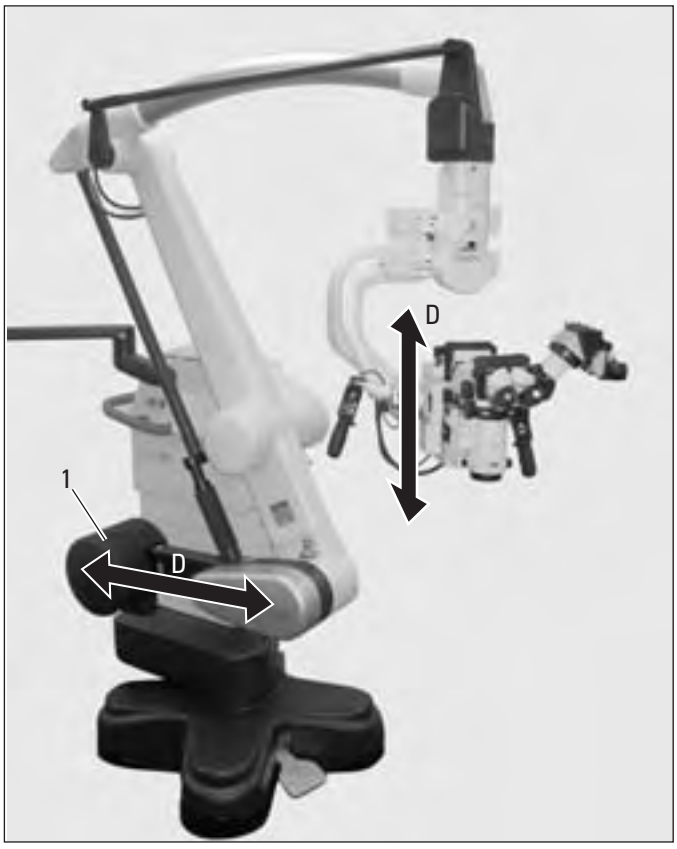
The optical carrier (in the B-position, e.g. for posterior fossa operations) tilts back:
⇨Move the B-axis forwards with switch (x) until the optical carrier is balanced.
The optical carrier tilts forwards:
⇨Move the B-axis back with switch (x) until the optical carrier is balanced.

If the microscope cannot be balanced manually, the weight of the accessories is probably outside the balanceable weight range. This can only be done for A, B and C axes by reducing or increasing the accessory weight to within the permitted range (see page 80).

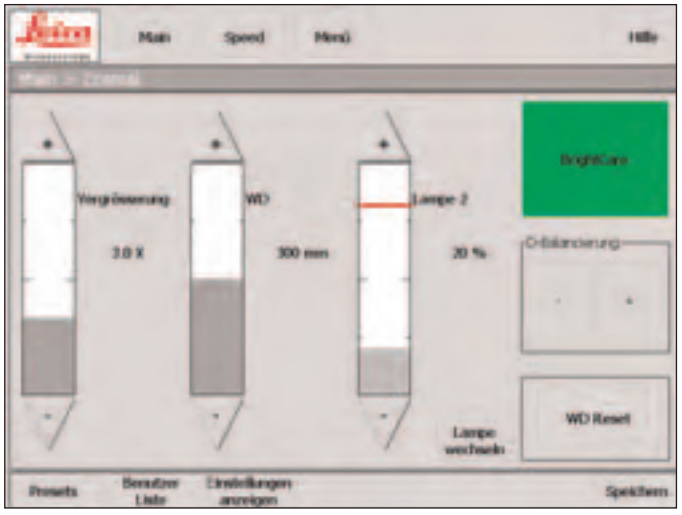
Correcting the D-balancing manually

The internal weight (3) in the stand balances the weight of the surgical microscope and the installed accessories.

☞ It may be necessary to correct the D-balancing after fitting a sterile drape on the microscope.



The D-balancing of the stand can be corrected with the "+" and "-" keys on the "Main" screen of the control unit.



"+" key: correction for higher load on the optical carrier
"-" key: correction for reduced load on the optical carrier

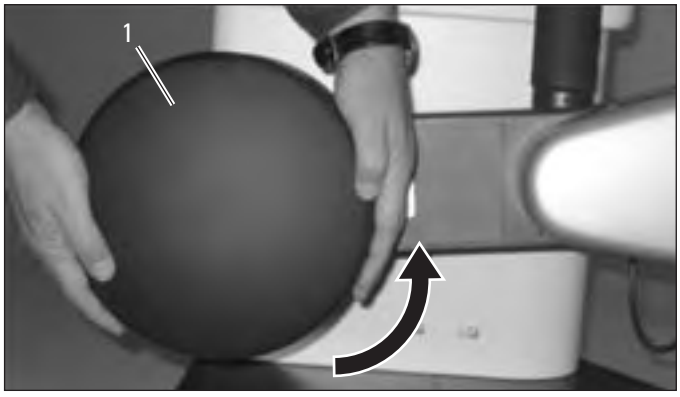
☞ To balance the D-axis when using accessories with different weights, the number of D-axis weight disks can be adapted accordingly (see below).

Changing the weight disk on the D-axis

If the Leica M525 OH4 cannot balance the accessories in use, a weight disk must be added to or removed from the D-axis.

Caution 1
Danger of injury due to falling weight disk or cover!
⇨When changing the weight disk, make sure that your feet are not beneath the weight disk or the cover.

⇨Locking the Leica M525 OH4 in position (see page 22).
⇨Detach the cover (1) from the axis.



⇨Unscrew the hexagon nut (3).

⇨Add or remove the disk (2).
⇨Screw on the hexagon nut (3).
⇨Re-attach the cover (1).

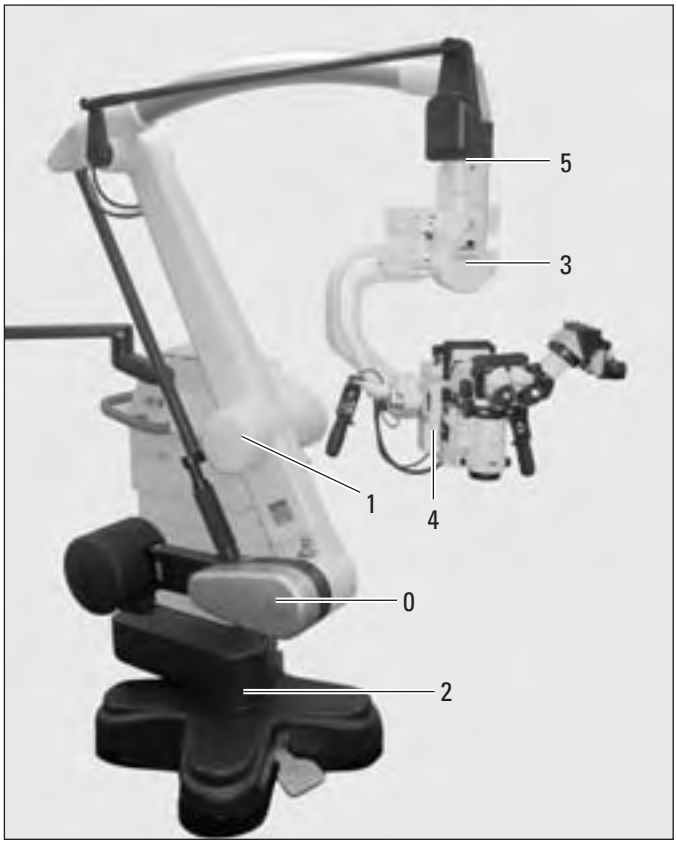
No. of weight disks		Load D-axis	
Heavy	Light	Min.	Max.
2	1	6.65	10.22
2*	2	7.4	10.88
2	3	7.9	11.54

*Standard configuration

Releasing the brakes

The Leica M525 OH4 surgical microscope has six electromagnetic brakes which stop the movements of the stand and surgical microscope:

- Up/down and forward/back in parallelogram (0 and 1)
- Base (2)
- In swing arm (3)
- On the A and B carriages of surgical microscope (4)
- In the rotary joint (5)



The CAN handle key with the "Selected Brakes" function (see also Assigning CAN handles, page 50) can release two different brake combinations: "Focus Lock" or "XYZ Free".

The brake combination "Focus Lock" is set as the default.

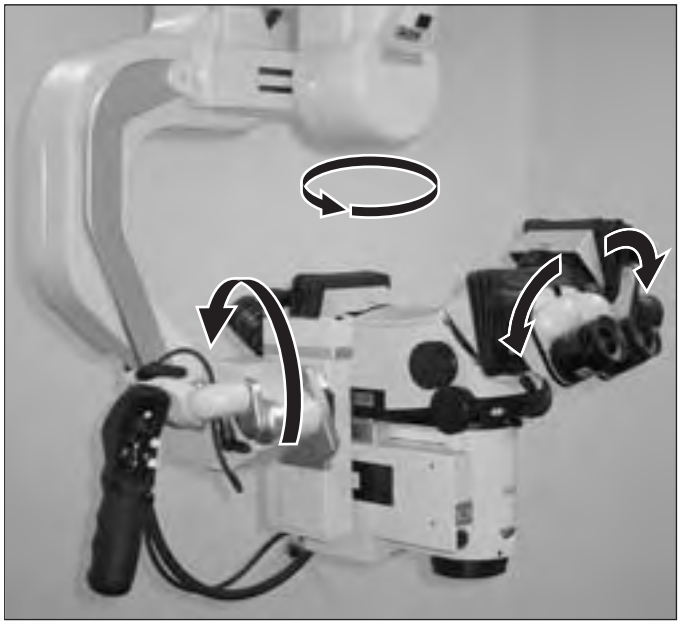
⇨Activate the desired brake combination "Focus Lock" or "XYZ Free" on the touch panel in the "Speed" menu by clicking the relevant button.

The button for the selected brake combination lights up green.

You can save the desired brake combination individually for each user in the user settings in the "Start Values Speed" menu.

The following movements can be performed with the surgical microscope when the brake combination "XYZ Free" is activated:

The following movements can be performed with the surgical microscope when the brake combination "Focus Lock" is activated:



Transport, transporting and rest positions

Warning 6
Danger of injury due to:
- **Uncontrolled lateral movement of the swing arm!**
- **Tilting of the stand!**
- **Feet in lightweight shoes could become trapped beneath the casing of the base.**

⇨For transportation, always move the Leica M525 OH4 surgical microscope into the transport position.
⇨Never move the stand in the extended condition.
⇨Never roll over cables lying on the floor.
⇨Always push the Leica M525 OH4 surgical microscope - never pull it.

Caution 2
Surgical microscope can move without warning!
⇨Always lock the footbrake when you are not moving the system.

Transport position

Always move your Leica M525 OH4 into the transport position before transporting it.

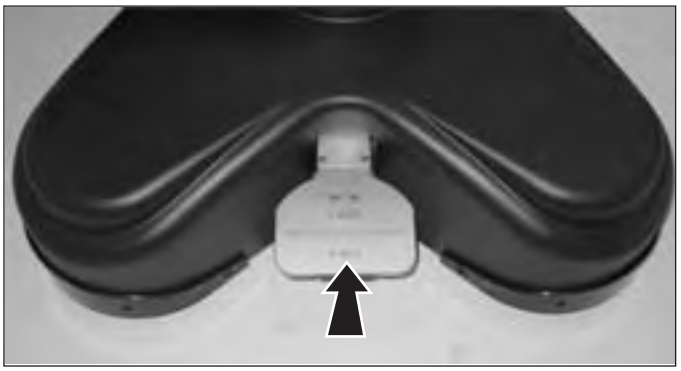
Caution 3
Damage to the Leica M525 OH4 surgical microscope due to uncontrolled tilting!
⇨Hold the CAN handle when releasing the brake.

Caution 4
Damage to the Leica M525 surgical microscope during transportation!
⇨Never move the stand in the extended condition.
⇨Never roll over cables lying on the floor.

⇨Press the "All Brakes" button and move the Leica M525 OH4 into the transport position (see illustration below).

Make sure that the video monitor does not collide with the horizontal arm and the vertical arm of the stand.

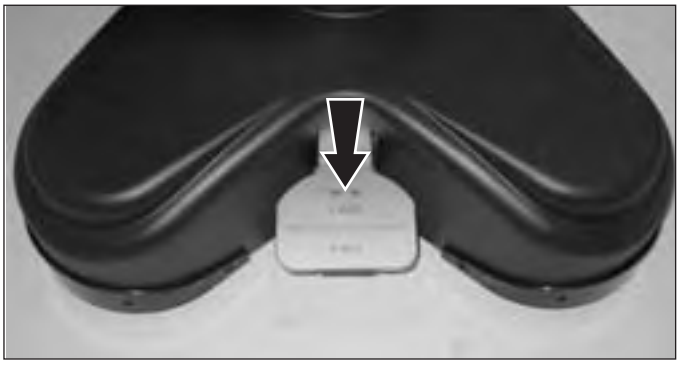
⇨Unplug and secure the power cable.
⇨Release the footbrake.
⇨Depress the footbrake at the front end (FREE).
The footbrake disengages and is released.



⇨Move the Leica M525 OH4 using the handle.

Rest position

Bring the microscope into rest position after use.
⇨Push the microscope in the transport position to its storage location.
⇨Depress the footbrake at the rear end (LOCK) until it engages.



⇨Pull the protective cover over the Leica M525 OH4.

Positioning on the operating table

Warning 3
Risk of injury through surgical microscope moving down!
⇨Never balance or re-equip the instrument over the field of operation.
⇨Always lock the Leica M525 OH4 in position before re-equipping it.
⇨Balance the Leica M525 OH4 after re-equipping it.
⇨Do not release the brakes when the instrument is in an unbalanced state.

The Leica M525 OH4 can be positioned easily on the operating table and offers a variety of possibilities for operations on the head or spinal column.

The M525 OH4 achieves this large range of positions through its very long and high swing arm.
⇨Release the footbrakes (see page 35).
⇨Move the Leica M525 OH4 surgical microscope carefully over to the operating table by the handle and into the required position for the operation.

Positioning options:

⇨Set footbrake.
⇨Plug the footswitch into the stand and position it.
⇨Plug the power cable into the stand.
⇨Connect the equipotential bonding to the stand.

Attaching sterile controls

Sterilizable covers can be fitted on the rotary buttons on the Leica M525 OH4 surgical microscope.

Covers for rotary buttons

Use the covers also when you use sterile disposable drapes.
The controls will be more grippy.

⇨Fit steam-sterilizable covers on the light field diameter adjustment knob and the working distance adjustment knob.

⇨Use steam-sterilizable covers also when using accessories.

Drape for footswitch

Packaging the footswitch in a plastic bag protects it against dirt.

Sterile drape for stand

You can also use an optional sterile disposable drape.

Caution 5
Risk of infection!
⇨Leave sufficient space around the stand to ensure that the sterile drape does not come into contact with non-sterile components.

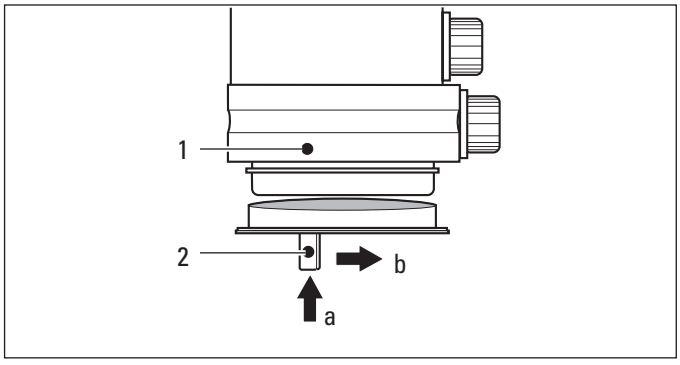
⇨Activate the "All Brakes" function on the CAN handle and extend the swing arm.
⇨Wear sterile gloves.
⇨Attach all sterile controls.
⇨Unpack the sterile drape carefully and drape it over the Leica M525 surgical microscope as far as the swing arm.
⇨Clamp the protective glass (optional) onto the objective.
⇨Do not attach the sterile drape too tightly with the provided ribbons. It must still be easy to move the instrument.

Check the ease of movement of the instrument.

Follow the instructions provided by the manufacturer of the sterile drape.

Attaching the protective glass to the objective

⇨Place the gas-sterilizable protective glass on the objective so that the marks on the optical carrier (1) and protective glass (2) are aligned one above the other.



⇨Insert the protective glass upwards into the bayonet mount in direction (a).
⇨Turn the protective glass in direction (b) until it engages.

Positioning the microscope

Coarse positioning

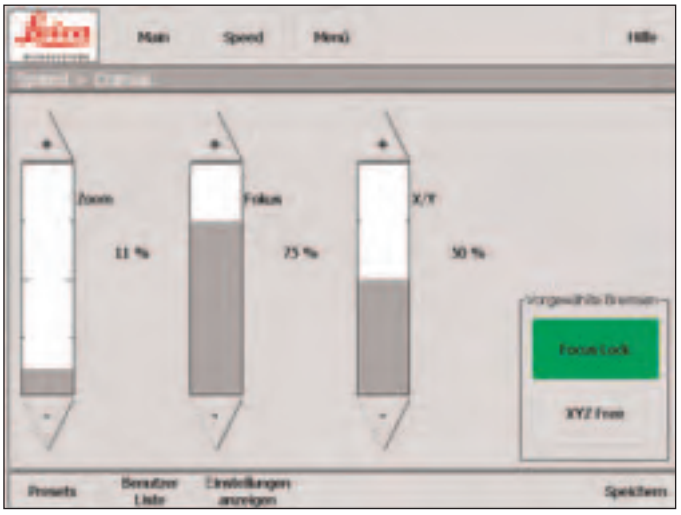
⇨Hold the microscope by both CAN handles.
⇨Press the button for releasing the brakes and position the microscope.
⇨Release the brakes button.

Also refer to the "Release brakes" chapter on page 34.

Caution 3
Damage to the Leica M525 OH4 surgical microscope due to uncontrolled tilting!
⇨Hold the CAN handle when releasing the brake.

Fine positioning

⇨Position the microscope with the XY drive using the joystick on the CAN handle or the joystick on the footswitch.



In the "Speed" menu you can adjust the speed at which the XY motors are operated.

This value can be saved individually for each user (see page 46).

Adjusting the microscope

Switching on the illumination

⇨Press push-button (1) for illumination.
The illumination comes on and the push-button is lit green.

☞ Leave the main and backup illumination on for at least 5 minutes, as otherwise luminosity will decrease rapidly.

Adjusting the brightness

Brightness can be increased or decreased using the touch panel monitor or a handswitch/footswitch or CAN handle.

On the touch panel monitor:
⇨Press the "+"- or "-" key on the brightness adjustment bar for illumination.
or
⇨Adjust the brightness directly in the bar.
The brightness of the active main illumination changes.

☞ Clicking the "+" or "-" key changes the brightness value in increments of one. Holding down the mouse button with your finger changes the value in increments of five.

☞ The start setting can be saved individually for each user.

☞ The main illumination can only be switched on and off using the illumination push-button (on/off) (1).

☞ The brightness setting is also visible when the illumination is off. However, the display bar will appear darker.

On the handswitch/footswitch /CAN handle:
Depending on assignment (see page 48), the brightness of the main illumination can also be increased or decreased using two correspondingly assigned keys on the handswitch/footswitch/ CAN handle.

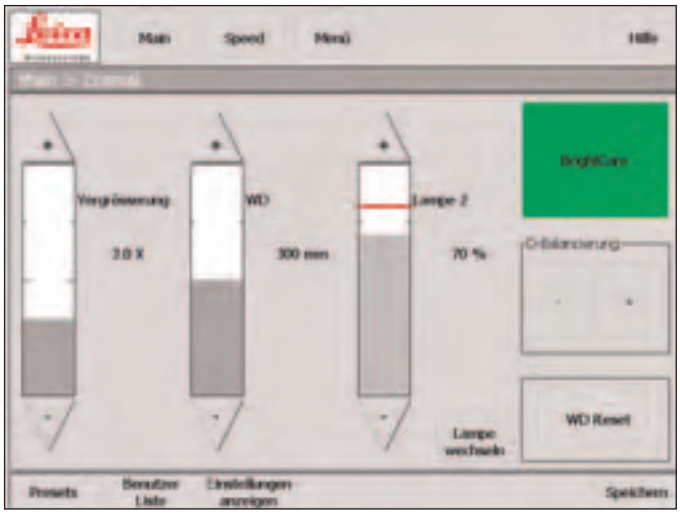
BrightCare™

BrightCare™ is a safety function which automatically limits the maximum brightness depending on the working distance. Excessively bright light can, in combination with a short working distance, cause burns in patients.

Explanation of luminous energy:
The optics of the Leica M525 OH4 surgical microscope have a variable working distance of between 207 and 470mm. The system is designed in such a way that it delivers sufficient light to produce a bright image even at a long working distance of 470mm.
According to the formula $E_v=I_v/d^2$, luminous energy increases constantly to 510% as a function of a reduction in working distance from 470 to 207mm. (E_v = light intensity, I_v= brightness, d= distance from light source).
This means that less light is required to work with the microscope at a shorter distance than at a greater distance.
It is advisable to begin with a low light output and increase the light intensity until an optimum level of illumination is achieved.

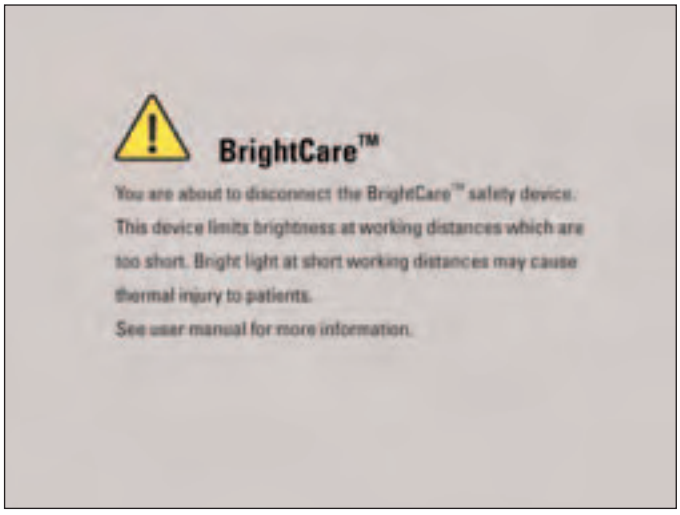
☞ With "BrightCare™" the safety function is activated for all users in the factory default configuration.

Explanation of heat release:
Heat from non-visible light (over 700nm) is filtered out of the light from the used xenon light source. Nevertheless, white light always releases heat. An excessive amount of white light can cause overheating of tissue and metallic objects.
Therefore, it is advisable to begin with a low light intensity and increase this until an optimum level of illumination is achieved.



The red line on the brightness adjustment bar shows the maximum adjustable brightness for the current working distance.
The brightness cannot be set to a level beyond the red line
When the working distance is reduced by too little at a set brightness, the brightness is reduced automatically.

This safety function can be deactivated by clicking the "Brightcare™" button. A dialog window opens in which you have to confirm that you want to deactivate the safety function.


BrightCare™
You are about to disconnect the BrightCare™ safety device.
This device limits brightness at working distances which are too short. Bright light at short working distances may cause thermal injury to patients.
See user manual for more information.

When the "Brightcare™" safety function is deactivated, the color of the "Brightcare™" button changes from green to yellow.

Warning 7
At a short focal distance, the light source of the illumination unit may possibly be too bright for the operating physician and the patient.
⇨Start with a low light level and gradually increase the light intensity until the operating physician has an optimally illuminated image.

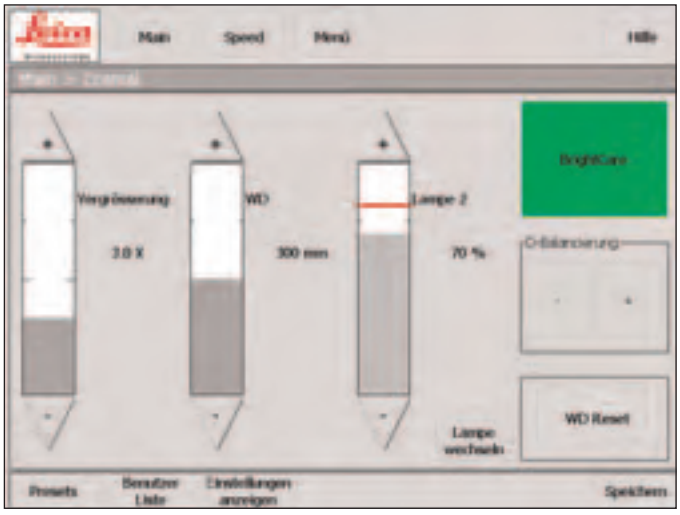
The status of the "BrightCare™" safety function can only be changed permanently in the "User settings" menu. A change in status during operational procedures will not be stored when the user settings are saved with "Save" or "Save as"!

Reactivating the "Brightcare™" safety function:
⇨Click the yellow "BrightCare™" button again.
"BrightCare™" is now activated and the button is again lit green.

Changing lamps

In case of failure of the xenon main illumination, your Leica M525 OH4 automatically uses the second xenon lamp as backup illumination.

☞ You can also switch manually to the backup illumination with the "Change Lamp" button on the "Main" screen.



☞ Replace the defective lamp at the next opportunity.

☞ Never begin an operation with only one functioning xenon lamp.

☞ A dialog window informs you when the xenon lamp is losing luminosity. We recommend that you keep a replacement lamp handy.

Changing over to backup illumination

⇨Undo screw knob (3) and open the access door (2) for lamp inserts on the illumination unit.
The push-button (1) flashes orange.

⚠ **Caution 6**
Hot lamp insert can cause burns!
⇨Do not touch the hot lamp insert.

⇨Push down the lamp quick changer (4).

Setting the illumination field diameter

Caution 7
Heating of tissue!
If the illumination field diameter is larger than the visual field and the light intensity is set too high, uncontrolled heating of tissue can occur outside the visible range of the microscope.
⇨Do not set the light intensity too high.

The light field diameter is automatically adapted to the size of the visual field at the Leica M525 optical carrier. The illumination field diameter can also be adjusted manually with rotary button (2). Automatic adjustment can be deactivated with the rotary button and reactivated with the Reset button (1).

If the illumination field diameter is blocked at a high light intensity in a high zoom setting, and cannot be adjusted automatically or manually, then the light intensity must be reduced in order to protect the tissue.

If the illumination field diameter remains blocked in a low zoom setting, and cannot be adjusted automatically or manually, then an OP lamp can be used for better illumination of a large visual field (low zoom setting).

Adjusting the magnification (zoom)

You can set the magnification with a footswitch/handswitch or with the "Magnification" adjustment bar in the "Main" menu of the control unit.

Clicking the "+" or "-" key changes the magnification value in increments of one. Holding down the mouse button with your finger changes the value in increments of five.

You can adjust the zoom motor speed in the "Speed" menu.

These values can be saved individually for each user (see page 46).

Warning 8
Danger to the patient due to failure of the zoom motor!
⇨In case of failure of the zoom motor, the zoom can be adjusted manually.

Manually adjusting the magnification (zoom)

Caution 8
Destruction of the zoom motor!
⇨Use the manual adjustment of the zoom motor only if the zoom motor is defective.

In case of failure of the zoom motor, the zoom can be adjusted manually using rotary button (3).

⇨Hold down rotary button (3).
⇨Set the desired magnification by turning the knob.

Setting the working distance (focus)

Warning 9
Danger of serious damage to tissue due to incorrect working distance!
⇨When using lasers, always set the working distance of the microscope to laser distance and lock the microscope in position.

You can set the working distance with the footswitch/hand-switch or with the "WD" adjustment bar in the "Main" menu of the control unit.

Clicking the "+" or "-" key changes the working distance in increments of one. Holding down the mouse button with your finger changes the value in increments of five.

You can adjust the focus motor speed in the "Speed" menu.

Using the Reset WD button, the focus motor can be set to the working distance which has been saved for the current user (see page 46).

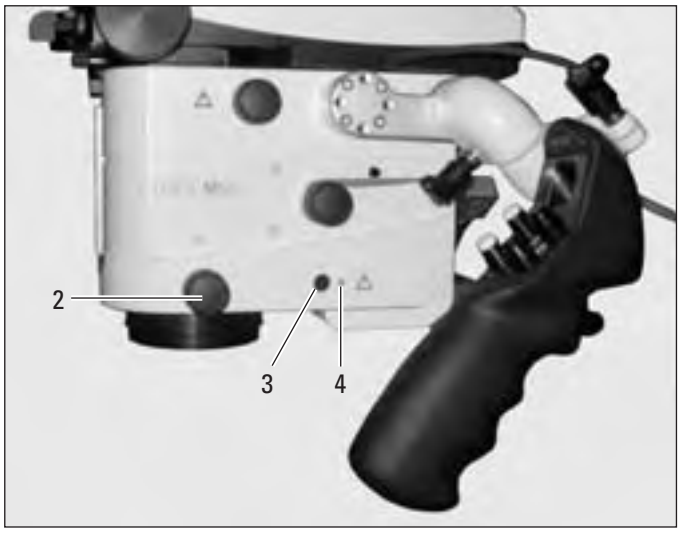
You can save the currently set working distance on the "Main" screen of the control unit or read it off the display (1) on the M525 optical carrier.

Warning 10
Danger to patient due to failure of the zoom motor!
⇨In case of failure of the zoom motor, the zoom can be adjusted manually.

Setting the focus manually

Warning 11
Danger of serious damage to tissue due to incorrect manual adjustment of the working distance!
⇨Do not adjust the rotary button for manual setting of the working distance while using the laser.

In case of failure of the focus motor, the focus can be adjusted manually using rotary button (2).



⇨Turn rotary button (2) and set the focus as required.

Locking/releasing the focus

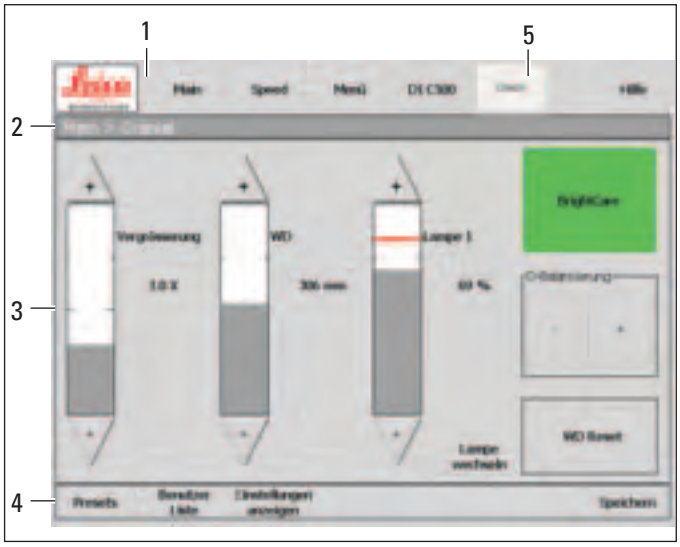
It is necessary to lock the focus when working at a fixed distance or when using the laser.

⇨Press key (3).
The yellow LED (4) comes on and the focus is locked.

⇨Press key (3) again.
The yellow LED (4) goes out and the focus is released.

Control unit with touch panel

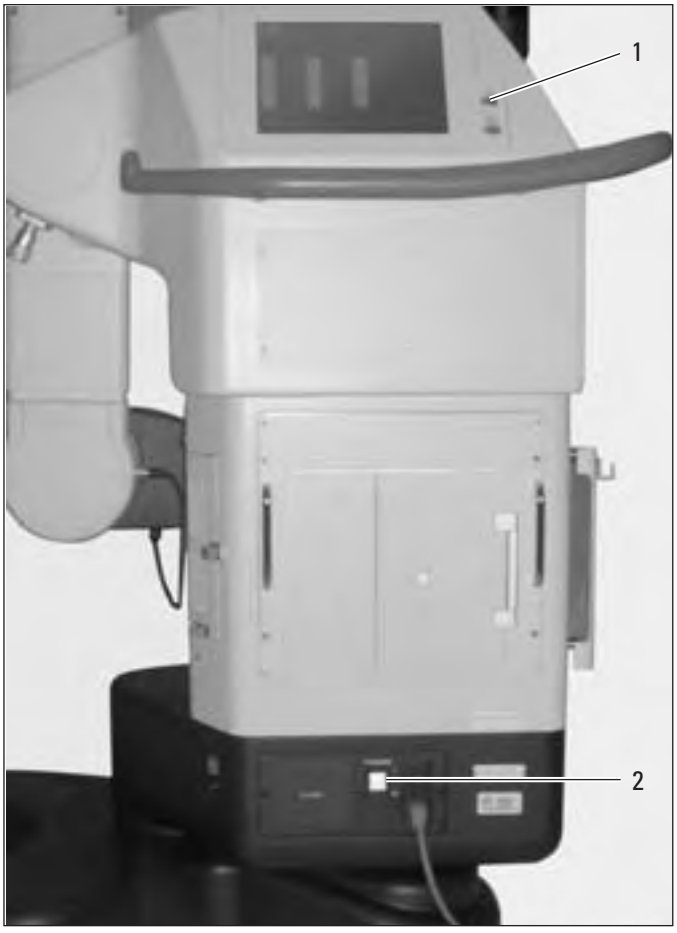
Menu structure



1 Quick access to the screens "Main", "Speed", "Menu", "DI C500" and "Help"
2 Warning messages
3 Status line
4 Display range
5 Dynamic button bar

Switching the microscope on

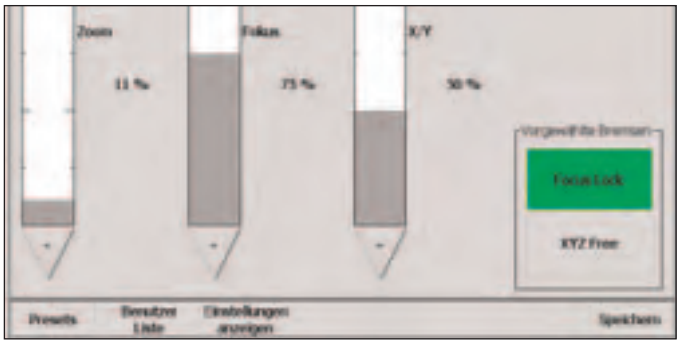
⇨Switch on the microscope at the power switch (2) on the stand.
After the surgical microscope is switched on, the settings of the last active user are loaded.
⇨Switch on the illumination with the key (1) on the control unit.



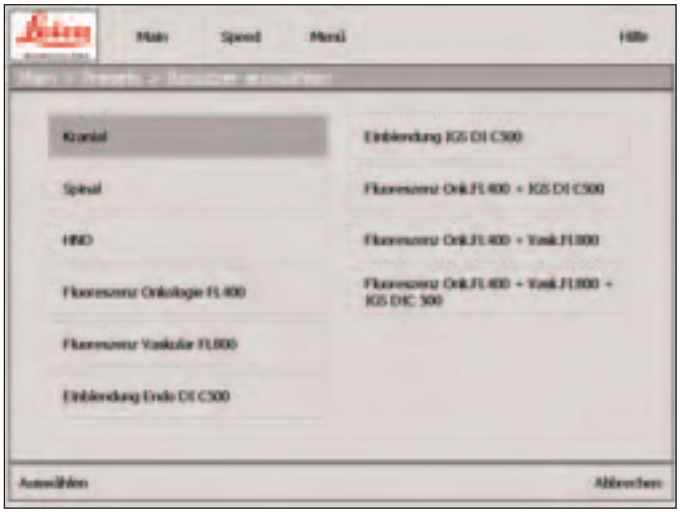
In operational mode, the status bar displays the current user and specifies the current location in the menu at all times.

Selecting users

In the "Main" and "Speed" menus, three buttons are always displayed in the dynamic button line: "Presets", "User List" and "Show Settings".



You can find a list of default users preset by Leica for the most common types of operation under "Presets".



⇨Select one of the preset default users and click "Load".
The Leica M525 OH4 surgical microscope is ready to operate straight away.

You can adapt and save the settings of these default users as required (see page 44).

You can click the "Show Settings" button at any time to see an overview of the user settings of the current user.

Clicking the "User List" button opens a two-screen list of users from which you can select one of up to 30 configurable users.

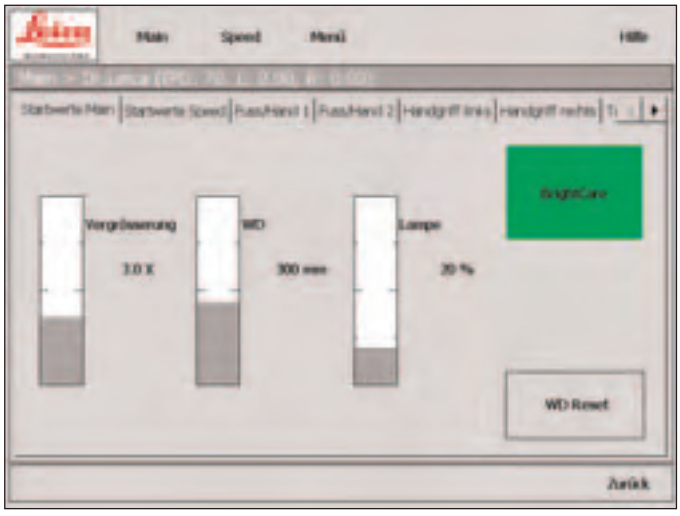
Click the "1-15" or "16-30" button to switch between screens.

⇨Select user and click "Select".
The user settings are loaded.

When the user list is open, it can be edited at any time (see page 45).

Before every operation, make sure the required user is selected and familiarize yourself with the assignments of the CAN handle and, if used, the optional footswitch.

⇨Click “Show Settings” button to see an overview of the user settings of the curent user.



Editing the user list

Various functions are available in the user list depending on the situation.

⇨Select user.
The available functions are displayed in the dynamic button line:

- "Move"
  Moves the selected user to another available location of your choosing.
- "Delete"
  Deletes the selected user.

Finally, you must confirm this action with "Acknowledge".

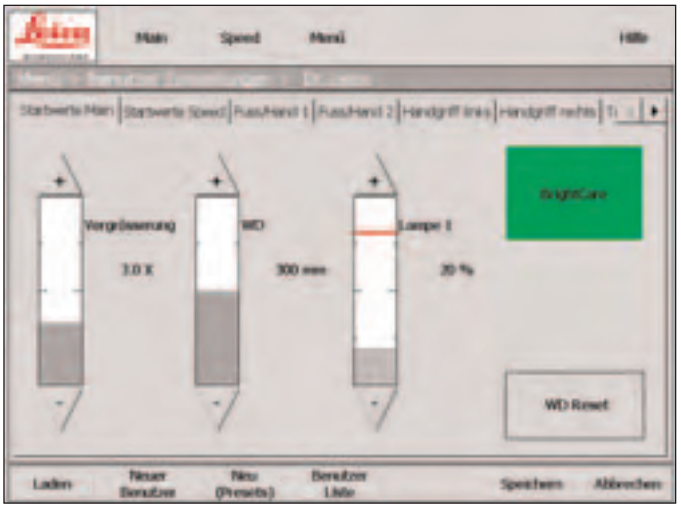
- "Rename"
  Renames an existing user. The user's settings are not changed.

In the "User Settings" menu, click the "Edit User List" button to access the dynamic button line in user list edit mode.

We recommend that you do not change the configuration of the user settings or edit the user list during an operation.

Configuring users (User Settings menu)

You can configure user settings in this menu.



- "Load"
  Loads the settings of an existing user from the user list for modifying.
- "New User"
  Opens a new user with "blank" settings.
- "New (Preset)"
  Opens the "Preset" screen for selecting a default user in order to create a new user with the settings of the desired preset and to load or modify the user's settings.

You can also add a user from the operational menu. If you want to keep the current settings, you can save them by clicking the "Save" button (which appears as soon as the basic settings of the current users have been changed), either for the current user ("Save") or under a new username ("Save as").

Saving user settings

⇨Click the "Save" button.
⇨In the user list select an available location where the user can be saved.

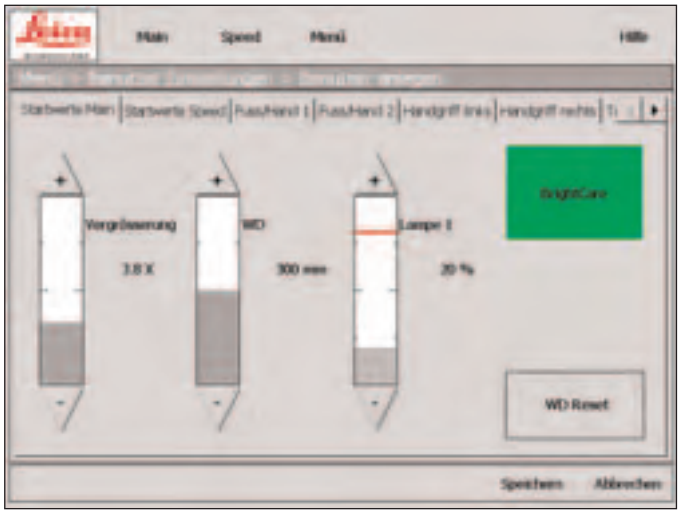
If you like, you can edit the user list first.

⇨Enter the desired username using the keyboard.

⇨Click the "Save" button to save the user at the desired location under the name you have entered.

Setting the "Main" start values

On this screen, you can set the start values for illumination, working distance and magnification.



Clicking the "+" or "-" key changes the values in increments of one. Holding down the mouse button with your finger changes the value in increments of five.

You can also set the desired value by directly clicking the bars.

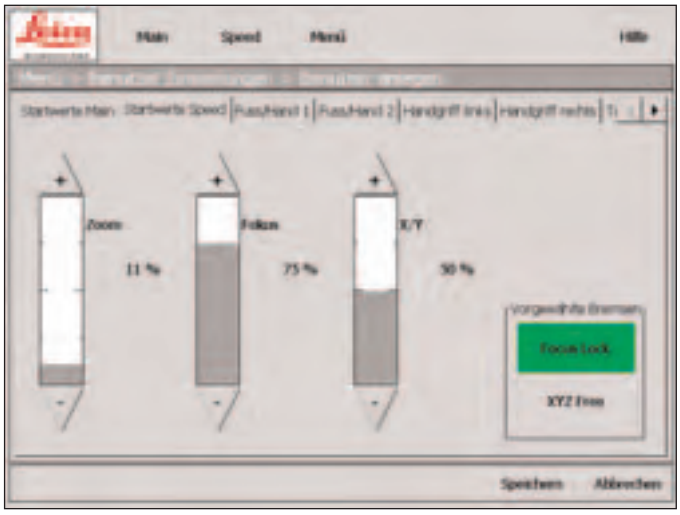
On the "Main" user settings screen you can set the status of the BrightCare™ safety function for the selected user.

On the "Main" user settings screen you can permanently save the default settings for WD-Reset. If "WD Reset" is activated, the focus motor automatically moves to the working distance saved for each user in the user settings when "All Brakes" are released. This function is deactivated in the factory default configuration.

⇨Click the "WD-Reset" button.
The "WD-Reset" function is activated, the "WD-Reset" button changes color form gray to green.

Setting the drive start values

You can set the start values for the travel speed of the zoom, focus and XY motors on this screen.

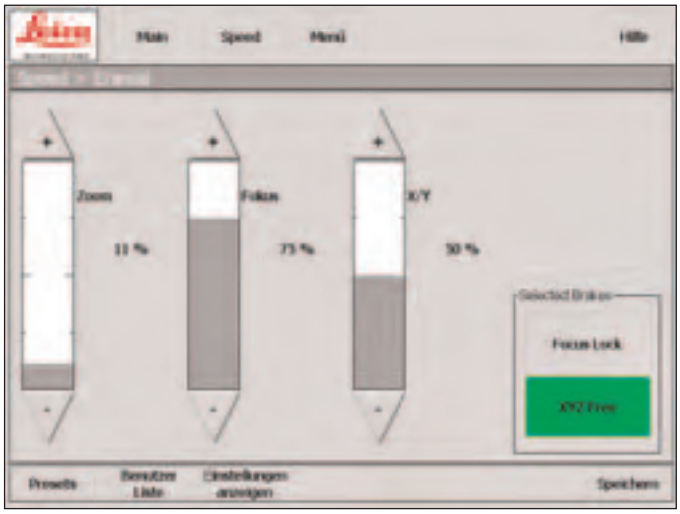


Clicking the "+" or "-" key changes the values in increments of one. Holding down the mouse button with your finger changes the value in increments of five.

You can also set the desired value by directly clicking the bars.

On the "Speed" menu screen you can also select the desired brake combination "Focus Lock" or "XYZ Free" for the CAN handle function "Selected Brakes".

⇨Activate the desired brake combination "Focus Lock" or "XYZ Free" on the touch panel in the "Speed" menu by clicking the relevant button.
The button for the preselected brake combination lights up green.



Footswitch/handswitch assignment

Here, you can configure individual settings for each user for the footswitch/handswitch you are optionally using.

⇨Select the footswitch/handswitch you are using in the right options menu.

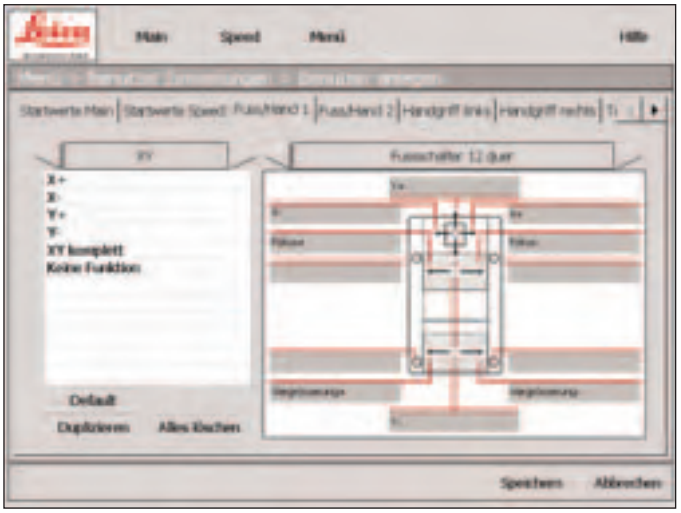
You can scroll forwards or backwards in the list by clicking the arrowheads.

You can also connect the 6-function footswitch to the Leica M525 OH4 as an option. The existing 6 switches have the same functions as the currently selected 12 or 16-function footswitch.

⇨Click the "Default" button.
The default settings are assigned to the selected footswitch/handswitch.

You can then modify these settings as you like.

Clicking the "Clear All" button clears the assignments for all keys.



Configuring individual keys

⇨Select the footswitch/handswitch you are using in the right options menu.

☞ You can scroll forwards or backwards in the list by clicking the arrowheads.

⇨Select the function group with the desired functions in the left options menu.

☞ You can scroll forwards or backwards in the list by clicking the arrowheads.

⇨Select the desired function.
⇨Click the caption of the desired key to assign the selected function to it.
or
⇨Press the corresponding key on the connected footswitch.

Overview of function groups

Drive:
Magnification +
Magnification -
Focus +
Focus -
No function

Extra:
AD.F.1 Toggle
AD.F.1 Pulse
AD.F.2 Toggle
AD.F.2 Pulse
MDRS 3 Record Start/Stop
XGA Out toggle 1/2
XGA Out toggle 1/2/3
Video toggle source
AF500 Start
No function

☞ You can change the status of a function with the "Toggle" function (e.g. on/off). The "Pulse" function continuously changes a status (such as increasing the brightness).

Light:
Illumination +
Illumination -
No function

XY:
X+
X-
Y+
Y-
XY Complete
No function

☞ With the "XY Complete" function, you can assign all four functions of the joystick simultaneously.

Fluorescence:
FL400 Mode On/Off
FL800 Mode On/Off
FL800 NIR Zoom Reset
MDRS3 FL:Record Start/Stop
MDRS3 FL:Playback&Enter
MDRS3 FL:Menu&Down
No function

DI C500 / IGS:
DI C500: Image Injection On/Off
DI C500: Shutter Control
DI C500: Brightness+
DI C500: Brightness-
IGS 1
IGS 2
IGS 3
IGS 4
No function

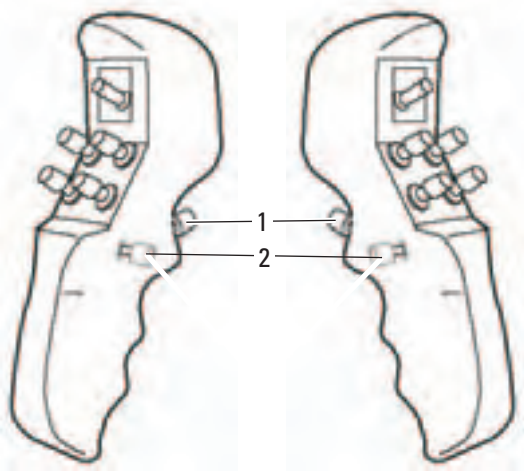
☞ To delete an assignment which you do not want, select the "No function" element - which can be found in all function groups - and assign it to the key in question.

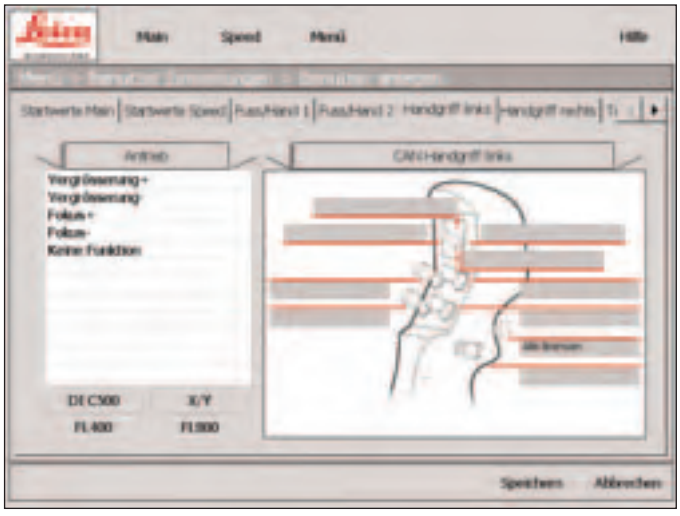
☞ If you are creating only one footswitch/handswitch configuration for one user, we recommend duplicating it to the second footswitch/handswitch input by pressing the "Duplicate" button.
This ensures that your footswitch/handswitch functions the way you want it to, regardless of which input it is plugged into.

CAN handle assignments

On the two CAN handle assignment screens, you can assign up to nine functions of your choice to the left and right CAN handles.

The "All Brakes" function is always assigned to the rear switch (1) for both CAN handles, and can neither be overwritten nor deleted.





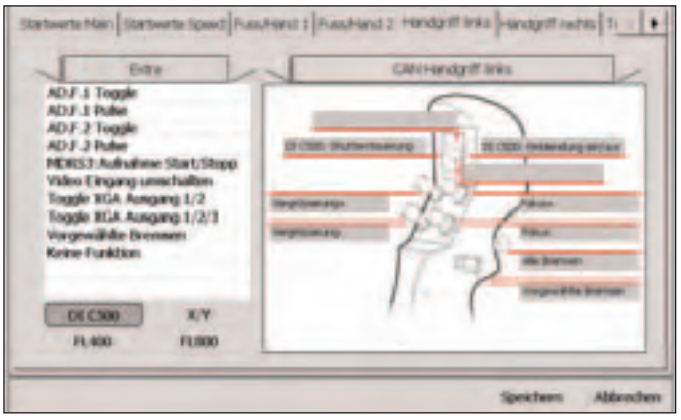
⇨Select the function group with the desired functions in the left options menu.

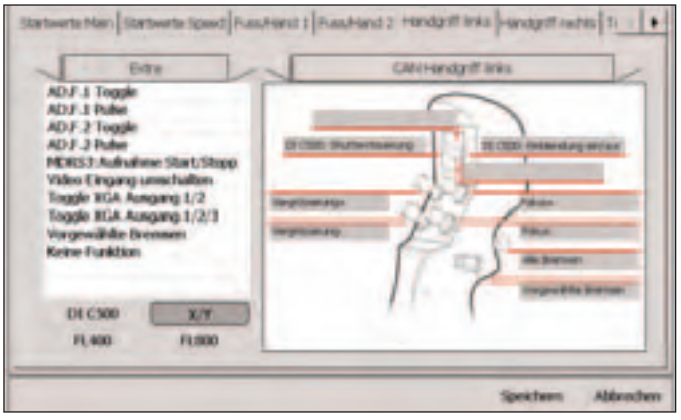
You can scroll forwards or backwards in the list by clicking the arrowheads.

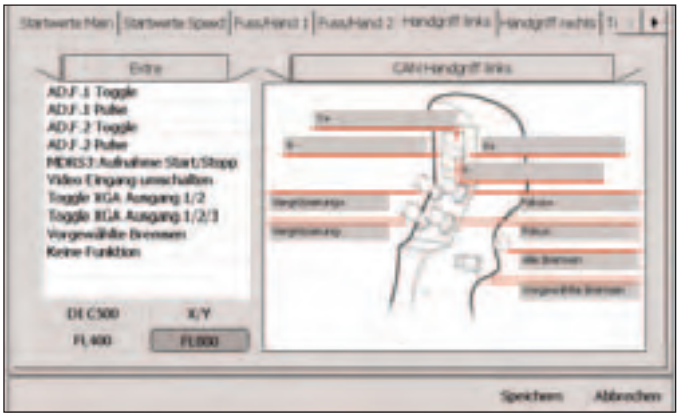
⇨Select the desired function.
⇨Click an available caption of the desired key to assign the selected function to it.

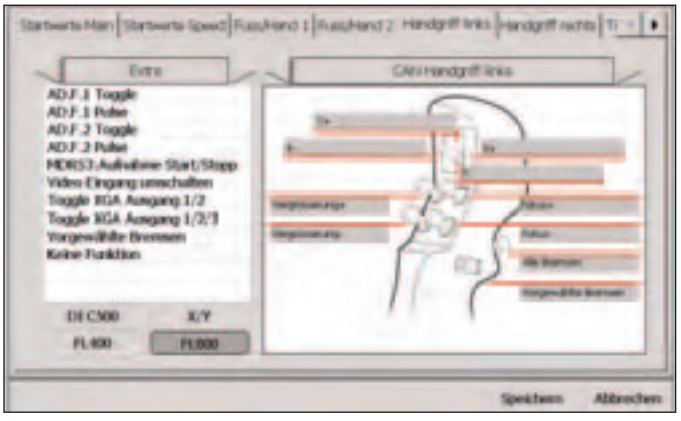
The inner switch (2) to which "Selected Brakes" is pre-assigned can be freely assigned, as required.

You can also assign one of the four defaults "DI C500", "X/Y", "FL400", "FL800" completely to each CAN handle.



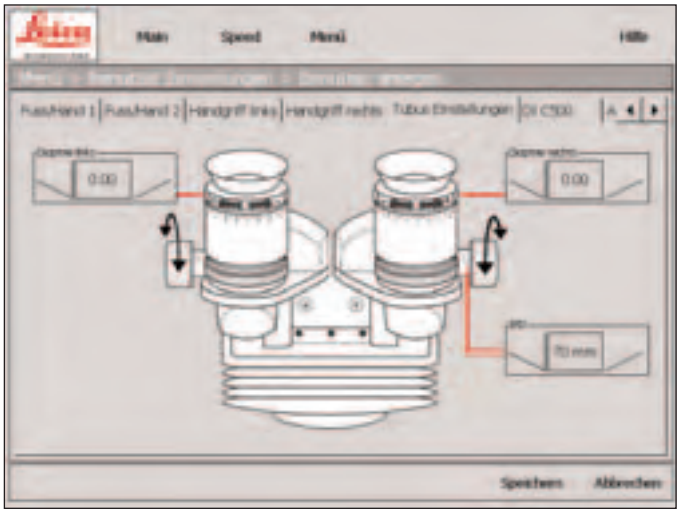






Tube Settings

On this screen, you can store the diopter values and interpupillary distance for each user.

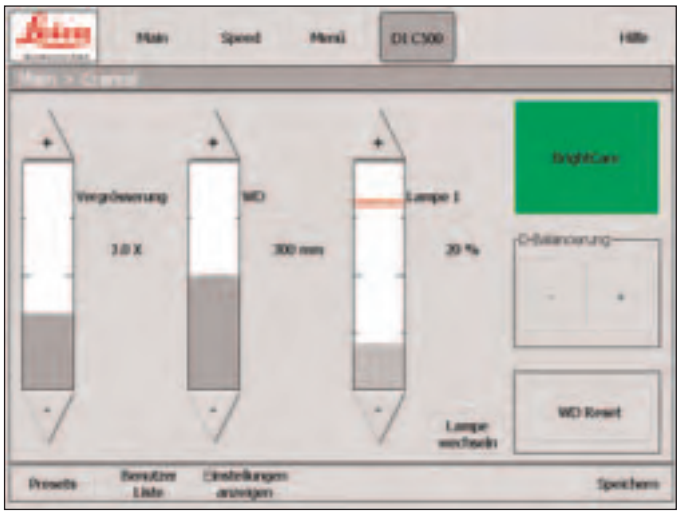


You can set the user-specific values by clicking the arrowheads. These values are shown for the current user in the status line.

Leica DI C500

Operating the control unit

If you are using a DI C500, a Quick Access Button "DI C500" is added to the static menu line.

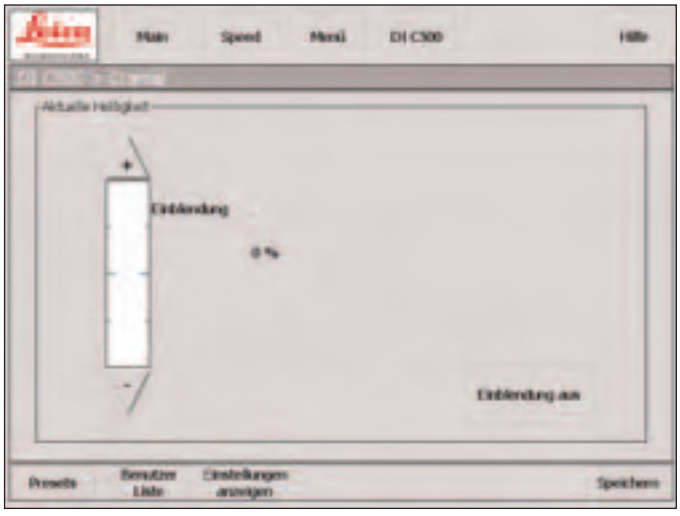


Changing the current brightness of the image data:
⇨Press the "+" or "-" key on the "DI C500" screen.
or
⇨Adjust directly by clicking the brightness adjustment bar.

Clicking the "+" or "-" key changes the brightness value in increments of one. Holding down the mouse button with your finger changes the value in increments of five.

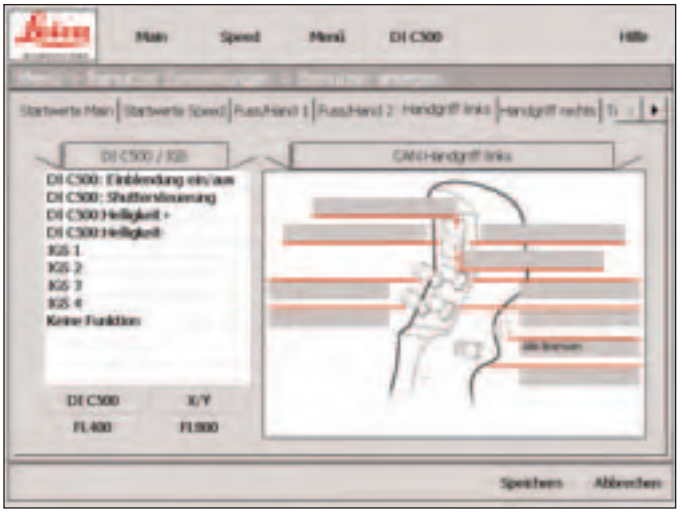
Press button “Image off” to switch of the DI C500 display (brightness = 0 %).

You can also adjust the brightness of the image data using the CAN handle/footswitch.



Controls on the CAN handle/footswitch

You can assign the following functions to your CAN handle/ footswitch for controlling your Leica DI C500 (see page 12):



"DI C500: Image Injection on/off"
Switches the data display on/off manually. The shutters are switched as pre-configured in the user settings.

You require this function for example when you want to display endoscope data on your Leica DI C500.

"DI C500: Shutter Control"
Opens or closes the shutter manually as pre-configured in the user settings.

"DI C500: Brightness+"
Increases the brightness of the image data.

"DI C500: Brightness-"
Reduces the brightness of the image data.

User settings

You can configure the following settings for the user in the user settings:
- Default brightness for the injection of overlay data and non overlay data
- Shutter settings for manual operation
- Shutter settings
- Surgeon's shutter settings

Setting the default brightness for the injection of overlay data and non overlay data:
⇨To adjust the brightness, press the "+" or "-" key or click directly in the bar.

Clicking the "+" or "-" key changes the brightness value in increments of one. Holding down the mouse button with your finger changes the value in increments of five.

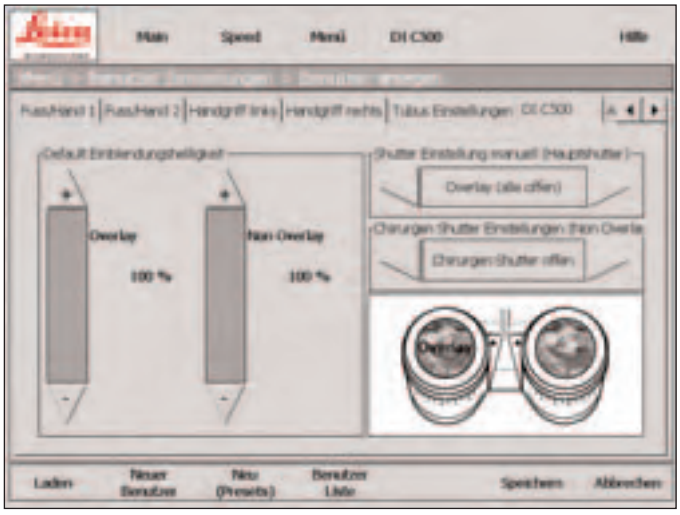
Shutter settings for manual operation:

You can adapt these settings intraoperatively using the CAN handle or on the "DI C500" screen on the control unit (see page 48).

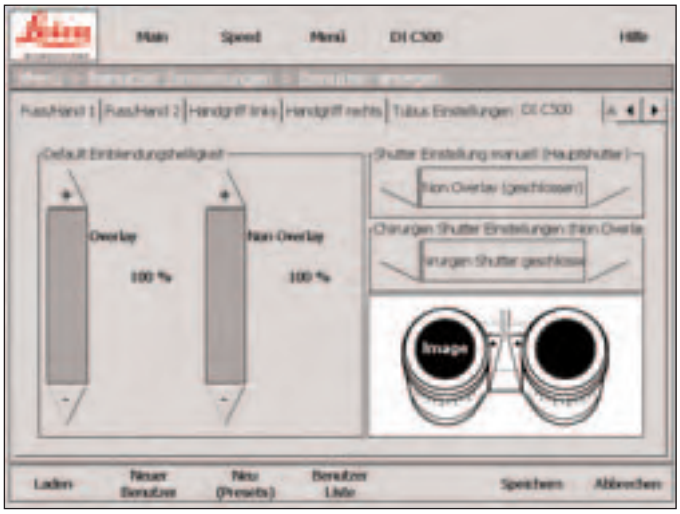
Shutter settings:

⇨Specify how data are to be displayed on your Leica DI C500 in the options menu "Manual Shutter Settings (Main Shutter)".

Overlay Data (open)
Displayed data are overlaid on the object.
All shutters are opened.



Non-Overlay (closed)
Displayed data are displayed on a black background. The shutter on the display side is closed.



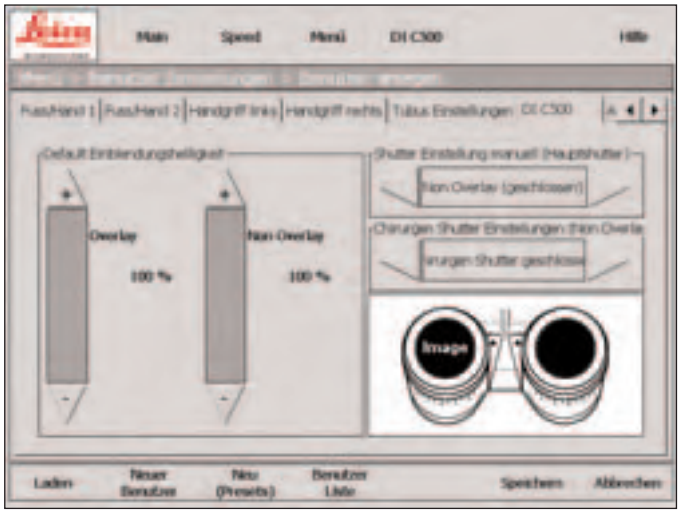
A connected IGS navigation system automatically controls the shutter independent of this setting.

Surgeon's shutter settings

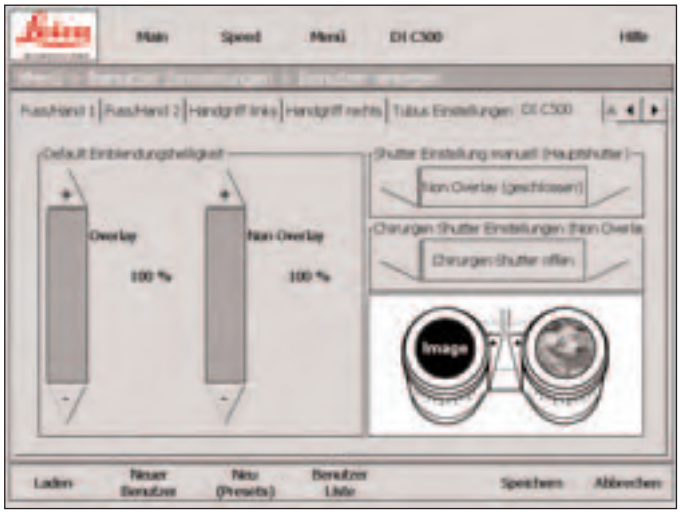
⇨In the options menu "Surgeon Shutter Settings (Non Overlay Data)" specify whether you want with or without object view in the non reflected beam path on the surgeon's side.

Surgeon's shutter closed
The second beam path is dimmed. In the other beam path, the data is displayed on a dark background.

This setting does not affect the assistant's view.



Surgeon's shutter open
You have a view of the object in the second beam path. In the other beam path, the data is displayed on a dark background.



In the preview window you can view the shutter settings you have selected, depending on the display side that is currently set on your Leica DI C500.

Leica AF500

The autofocus Leica AF500 works with the cameras Leica2, Sony DXC 33P and Leica UV-camera Hitachi. Contact your Leica representative if you want to adapt another camera.

We recommend to use the Leica AF500 only in combination with a video adapter having a fix focal length.

Operating

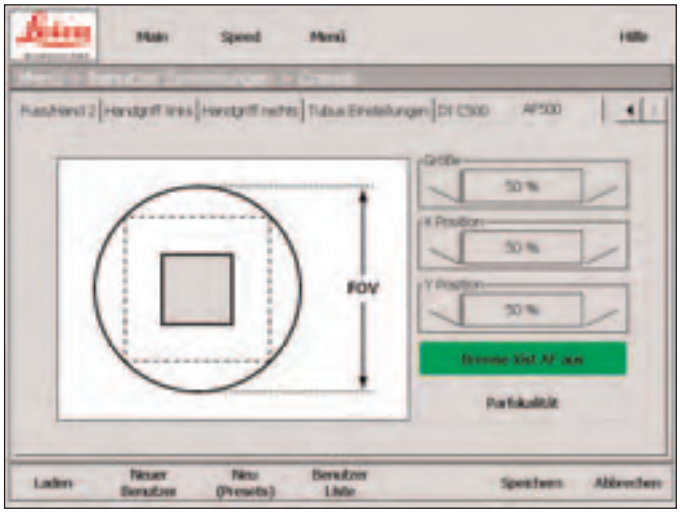
⇨To switch on the autofocus press on/off button on the front side of the housing.
⇨Start autofocus function by pressing the corresponding button on the CAN handle.
(see "Footswitch/handswitch assignment "on page 48)

If you activate the „Brake starts Autofocus" function in the user settings menu the autofocus is automatically focussing when releasing „All brakes" or „Selected Brakes" .

If you activate the parfocality function in the user settings menu the autofocus is always driving in maximum position first, then in minimum position and back to current set working distance when focussing.

User settings in the control unit

The autofocus can be individually assigned for each user in the "User Settings" menu.



Resize autofocus window
The preview shows actual size of the autofocus window. Autofocus window displays the area of the object that is to be focussed on.

You can proportionately increase or decrease the size of the autofocus window for your needs. The default setting is 25%.

Clicking the "+" or "-" key changes the value in increments of one. Holding down the mouse button with your finger changes the value in increments of five.

Because autofocus needs a flat image plane to be set in focus you should reduce the size of the autofocus window. The default Setting is 25%.

Adjusting the position of autofocus window

The preview shows actual position of the autofocus window. Autofocus window displays the area of the object that is to be focussed on.

You can move the position of the autofocus window. Adjust value for X- and Y-position.

Clicking the "+" or "-" key changes the value in increments of one. Holding down the mouse button with your finger changes the value in increments of five.

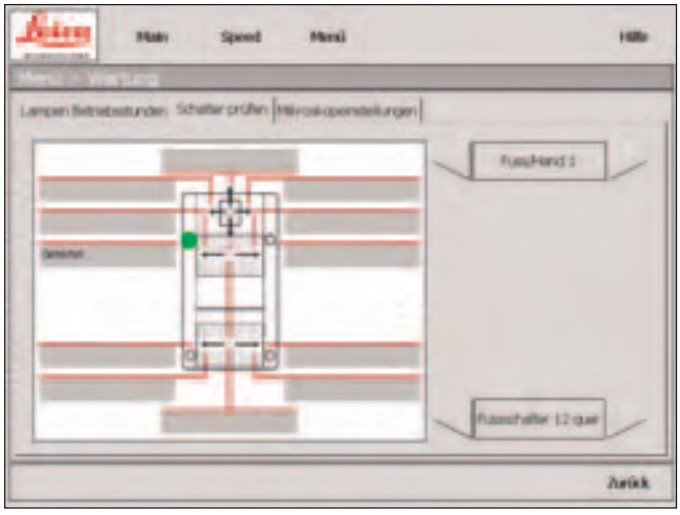
The default setting is 50 % along each axis. This places the autofocus window exactly in the centre.

The Maintenance menu

Hour meter for the bulbs (Lamp History)
On this screen, you can view the operating hours of xenon lamp 1 and xenon lamp 2.

Whenever you replace a bulb, reset the bulb's hour meter to 0 by double-clicking the "Reset" button.

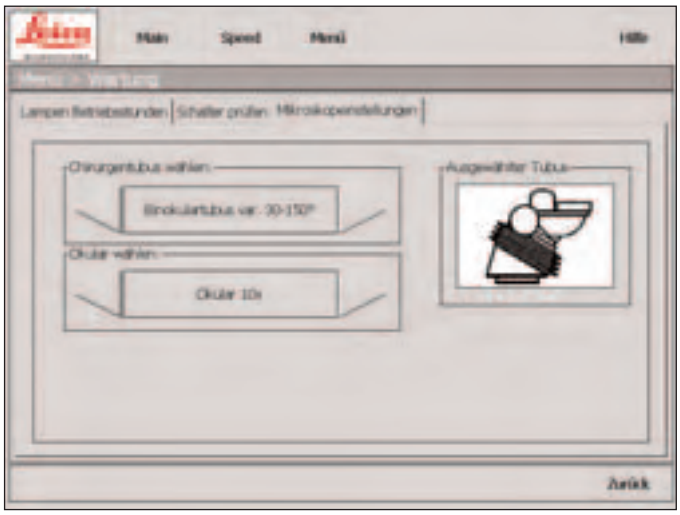
Check switches
On this screen, you can test the footswitches/handswitches and CAN handles you are using.



⇨Select the connection you are using in the right upper options menu.
⇨You can scroll forwards or backwards in the list by clicking the arrowheads.
⇨Select the footswitch/handswitch or CAN handle to be tested in the right lower options menu.
⇨You can scroll forwards or backwards in the list by clicking the arrowheads.
⇨Press all of the keys, one after the other, of the footswitch/handswitch or CAN handle you want to test.
If the key you have pressed is functioning properly, a green dot appears on it on the display. The comment "Tested" appears in the caption field of the key.

Microscope settings

On this screen you can configure the accessories you are using.
This ensures that the correct magnification is displayed on the "Main" menu screen.



⇨In the top options field, enter the tube currently being used by the surgeon.
⇨You can scroll forwards or backwards in the list by clicking the arrowheads.
⇨In the middle options field, select the magnification of the eyepieces being used by the surgeon.
⇨You can scroll forwards or backwards in the list by clicking the arrowheads.

☞ If you do not make a selection, the magnification is calculated for the standard equipment - binocular tube 30°-150° and eyepiece with 10x magnification.

The "How to…" menu

This screen displays, in short form, user instructions for operating your surgical microscope.

☞ The "Help" button in the static menu bar provides access to the "How To..." screens at all times.

The Service menu

This area is password-protected.

The Leica M525 OH4 surgical microscope is state-of-the-art technology. Nevertheless, hazards can arise during operation.
⇨Always follow the instructions in this user manual, and in particular the safety guidelines.

Intended use

- The Leica M525 OH4 surgical microscope is an optical instrument for improving the visibility of objects through magnification and illumination. It can be applied for observation and documentation and for human and veterinary medical treatment.
- The Leica M525 OH4 surgical microscope may be used only in closed rooms and must be placed on a solid floor.
- The Leica M525 OH4 surgical microscope is subject to special precautionary measures for electromagnetic compatibility. They must be installed and put into operation in accordance with the guidelines, manufacturer's declarations and recommended safety distances (Tables 201, 202, 204, and 206 according to EN 60601-1-2:2001).
- Portable and mobile as well as stationary RF communications equipment can have a negative effect on the reliability of the Leica M525 OH4 surgical microscope.

Warning 12
Not suitable for use in ophthalmology!

Directions for the person responsible for the instrument

⇨Ensure that the Leica M525 OH4 surgical microscope is used only by persons qualified to do so.
⇨Ensure that this user manual is always available at the place where the Leica M525 OH4 surgical microscope is in use.
⇨Carry out regular inspections to make certain that the authorized users are adhering to safety requirements.
⇨When instructing new users, do so thoroughly and explain the meanings of the warning signs and messages.
⇨Assign individual responsibilities for starting, operating and servicing the Leica surgical microscope and monitor the observance of these responsibilities.
⇨Only use the Leica M525 OH4 surgical microscope if it is free of defects.
⇨Inform your Leica representative or Leica Microsystems (Schweiz) AG, BU SOM, 9435 Heerbrugg, Switzerland, immediately if you detect a product defect that could potentially cause injury or harm.
⇨If you use accessories made by third-party manufacturers with the Leica M525 OH4 surgical microscope, be sure that each such manufacturer confirms the safety-engineering, harmless usability of the product and observe the product's user manual.
⇨Modifications to or service on the Leica M525 OH4 surgical microscope may be carried out only by technicians who are explicitly authorized by Leica to do so.
⇨Only original Leica replacement parts may be used in servicing the product.
⇨After servicing or making technical modifications, the instrument must be re-set in accordance with our technical specifications.
⇨Leica accepts no liability if the instrument is modified or serviced by unauthorized persons, not maintained as specified (unless maintenance is performed by us) or not used/handled properly.
⇨Interaction of other devices through the Leica surgical microscope was proven in accordance with EN 60 601-1-2. The system passed the emission and immunity test. The standard safety precautions and safety requirements relating to electromagnetic and other radiation must be observed.
⇨Domestic electrical installation must be conducted in accordance with the national standard, e.g. use of a residual current protective device (FI protection) is recommended.
⇨As with every other instrument used in operative applications, this system is subject to failure. Leica Microsystem (Schweiz) AG therefore recommends that a backup system be kept available during the operation.

Directions for the operator of the instrument

⇨Follow the instructions described here.
⇨Follow the directions provided by your employer regarding work organization and safety.

Stability
When moved in the OP, the swing arm must be folded up and locked and the brakes must be applied, otherwise the swing arm may drift out of control and the stand could topple.

Hazards due to moveable parts
This section describes uses that, inadvertently, could lead to hazardous situations.

- Add accessories and balance the stand before the operation, and never over the field of operation.
- Do not put your fingers between the microscope and the focusing drive; they could get crushed.

Floor stand:
- When displacing the stand, push it. Do not pull it. Feet in light-weight shoes could become trapped beneath the casing of the base.
- The footbrakes must remain engaged throughout the operation.

Electrical terminals
The control unit may be opened only by a Leica-approved service technician.

Accessories
Only the following accessories may be used on the Leica M525 OH4 surgical microscope:
- The Leica accessories described in this user manual.
- Other accessories, provided that these have been expressly approved by Leica as being technically safe in this context.

Dangers of use

Warning 1
Danger of fatal electrical shock!
⇨The Leica M525 OH4 surgical microscope may be connected to a grounded safety socket only.

Warning 2
Danger of fatal electric shock.
⇨Operate the system only with all equipment in its proper position (all covers fitted, doors closed).

Warning 3
Risk of injury through surgical microscope moving down!
⇨Complete all preparations and adjustments to the stand before the operation.
⇨Never balance or re-equip the instrument over the field of operation.
⇨Always lock the Leica M525 OH4 in position before re-equipping it.
⇨Balance the Leica M525 OH4 after re-equipping it.
⇨Do not release the brakes when the instrument is in an unbalanced state.
⇨Before re-equipping during the operation, first swing the microscope away from the operating field.

Warning 4
Danger of injury due to movement of the microscope during the balancing process.
⇨Do not stand next to the microscope during the balancing process.

Warning 5
Danger of injury due to swinging down of the Leica M525 OH4 surgical microscope.
⇨Never balance or re-equip the instrument over the field of operation.
⇨Balance the Leica M525 OH4 surgical microscope after re-equipping it.
⇨Do not release the brakes when the instrument is in an unbalanced state.
⇨Never perform intraoperative AC / BC balancing over the patient.

Warning 6
Danger of injury due to:
- **Uncontrolled lateral movement of the swing arm!**
- **Tilting of the stand!**
- **Feet in lightweight shoes could become trapped beneath the casing of the base.**

⇨For transportation, always move the Leica M525 OH4 surgical microscope into the transport position.
⇨Never move the stand in the extended condition.
⇨Never roll over cables lying on the floor.
⇨Always push the Leica M525 OH4 surgical microscope - never pull it.

Warning 7
At a short focal distance, the light source of the illumination unit may possibly be too bright for the operating physician and the patient.
⇨Start with a low light level and gradually increase the light intensity until the operating physician has an optimally illuminated image.

Warning 8
Danger to the patient due to failure of the focus motor!
⇨In case of failure of the focus motor, the focus can be adjusted manually.

Warning 9
Danger of serious damage to tissue due to incorrect working distance!
⇨When using lasers, always set the working distance of the microscope to laser distance and lock the microscope in position.

Warning 10
Danger to patient due to failure of the zoom motor!
⇨In case of failure of the zoom motor, the zoom can be adjusted manually.

Warning 11
Danger of serious damage to tissue due to incorrect manual adjustment of the working distance!
⇨Do not adjust the rotary button for manual setting of the working distance while using the laser.

Warning 12
Not suitable for use in ophthalmology!

Caution 1
Danger of injury due to falling weight disk or cover!
⇨When changing the weight disk, make sure that your feet are not beneath the weight disk or the cover.

Caution 2
Surgical microscope can move without warning!
⇨Always lock the footbrake when you are not moving the system.

Caution 3
Damage to the Leica M525 OH4 surgical microscope due to uncontrolled tilting!
⇨ Hold the CAN handles securely before you press the "All Brakes" button.

Caution 4
Damage to the Leica M525 surgical microscope during transportation!
⇨Never move the stand in the extended condition.
⇨Never roll over cables lying on the floor.

Caution 5
Risk of infection!
⇨Leave sufficient space around the stand to ensure that the sterile drape does not come into contact with non-sterile components.

Caution 6
Hot lamp insert can cause burns!
⇨Do not touch the hot lamp insert.

Caution 7
Heating of tissue
If the illumination field diameter is larger than the visual field and the light intensity is set too high, uncontrolled heating of tissue can occur outside the visible range of the microscope.
⇨Do not set the light intensity too high.

Caution 8
Destruction of the zoom motor!
⇨Use the manual adjustment of the zoom motor only if the zoom motor is defective.

Caution 9
Damage of the touch panel
⇨Operate the touch panel using your fingers only. Never use hard, sharp or pointed objects made out of wood, metal or plastic.

Caution 10
Damage of the touch panel
⇨Never clean the touch panel using cleaners that contain abrasive substances. These substances can scratch the surface and cause it to be become dull.

Caution 11
Danger of skin burns!
The lamp insert is very hot.
⇨Before changing the lamp, make sure that the lamp insert has cooled down.

Manufacturer's declaration of electromagnetic compatibility (EMC)

This "Guidance and manufacturer's declaration" document is based on EN 60601-1-2:2001.

Table 201 from EN 60601-1-2:2001

Guidance and manufacturer's declaration – electromagnetic emissions		
The Leica M525 OH4 surgical microscope is intended for operation in an environment as specified below. The customer or the user of the Leica M525 OH4 surgical microscope should make sure that it is used in such an environment..		
Emissions test	**Compliance**	**Electromagnetic environment – guidance**
RF emissions according to CISPR 11	Group 1	The Leica M525 OH4 surgical microscope uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions according to CISPR 11	Class A	The Leica Leica M525 OH4 is suitable for use in establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for residential purposes.
Harmonic emissions according to IEC 61000-3-2	Class A	
Emissions of voltage fluctuations/flicker according to IEC 61000-3-3	compliant	

Table 202 from EN 60601-1-2:2001

Guidance and manufacturer's declaration – electromagnetic immunity			
The Leica M525 OH4 surgical microscope is intended for operation in an environment as specified below. The customer or the user of the Leica M525 OH4 surgical microscope should make sure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment – guidance**
Discharge of static electricity (ESD) according to IEC 61000-4-2	± 6KV contact discharge ± 8KV air	± 6KV contact discharge ± 8KV air	Floors should be of wood, concrete or ceramic tile. If the floor is of synthetic material, the relative humidity must be at least 30%.
High-freq. transient electrical interference / Burst according to IEC 61000-4-4	± 2KV for power lines ± 1KV for input and output lines	± 2KV for power lines ± 1KV for input and output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surges according to IEC 61000-4-5	± 1KV normal mode ± 2KV common mode	± 1KV normal mode ± 2KV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage drops short interruptions and voltage variations IEC 61000-4-11	<5% UT (>95% dip in UT) for ½cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles <5% UT (>95% dip in UT) for 5 sec.	<5% UT (>95% dip in UT) for ½cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles <5% UT (>95% dip in UT) for 5 sec.	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Leica M525 OH4 surgical microscope requires that the instrument remain functional even after mains power interruptions, it is recommended that the Leica M525 OH4 surgical microscope be provided with an auxiliary power source such as an uninterruptible power supply (UPS) or battery back-up.
Magnetic fields at mains frequency (50/60Hz) according to IEC 61000-4-8	3 A/m	not applicable	
Note:	U_T is the a.c. mains voltage prior to application of the test level.		

Table 204 from EN 60601-1-2:2001

Guidance and manufacturer's declaration – electromagnetic immunity			
The Leica M525 OH4 surgical microscope is intended for operation in an environment as specified below. The customer or the user of the Leica M525 OH4 surgical microscope should make sure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment – guidance**
			Portable and mobile RF communications should be used no closer to any part of the Leica M525 OH4, including its cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
Conducted RF – Interference according to IEC 61000-4-6	$3V_{eff}$ 150kHz to 80MHz	$3V_{eff}$	**Recommended separation distance:** $d = 2.4\sqrt{P}$ for 150kHz to 80MHz
Radiated RF – Interference according to IEC 61000-4-6	3V/m 80MHz to 2.5GHz	3V/m	$d = 2.4\sqrt{P}$ for 80MHz to 2.5GHz where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol:

Note 1: At 80MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Leica M525 OH4 surgical microscope is used exceeds the applicable RF compliance level above, the Leica M525 OH4 surgical microscope should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the Leica M525 OH4 surgical microscope.

b Over the frequency range 150kHz to 80MHz, field strengths should be less than 3V/m.

Table 206 from EN 60601-1-2:2001

Recommend separation distances between portable and mobile RF telecommunications equipment and the Leica M525 OH4 surgical microscope	
The Leica M525 OH4 surgical microscope is intended for operation in an electromagnetic environment in which RF interference is controlled. The customer or the user of the Leica M525 OH4 surgical microscope can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Leica M525 OH4 surgical microscope as recommended below, according to the maximum output power of the communications equipment.	
	Separation distance according to frequency of transmitter in m
Rated maximum output power of transmitter W	**150kHz to 2.5GHz** $d = 2.4 \sqrt{P}$ in m
0.01	0.24
0.1	0.8
1	2.4
10	8.0
100	24.0
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer. Note 1: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.	

Warning message:
If use is made of accessories or cables other than those specified in this user manual or approved by the manufacturer of the Leica M525 OH4 surgical microscope, this can lead to an increase in electromagnetic radiation or a reduction in EMC.

Warning message:
The Leica M525 OH4 surgical microscope must not be used directly adjacent other instruments.
If it is necessary to operate them in the vicinity of other instruments, the microscopes should be monitored to ensure that they function properly in this arrangement.

Signs and labels

1

2

DO NOT USE IN OPHTALMOLOGY

3

Grounding reliability can only be achieved when EQUIPMENT is connected to equivalent receptacle marked "Hospital only" or "Hospital Grade".

La fiabilité de la mise à la terre n'est assurée que si l'équipement est connecté à une prise équivalente, marquée «Hôpital seulement» ou «Qualité hôpital».

4

MITAKA KOHKI CO. LTD
No.
Made in Japan

5

Leica Microsystems (Schweiz) AG
CH-9435 Heerbrugg

MODEL LEICA M525 OH4

1600 VA 50/60 Hz
100/120/220/240 V ~

PRIM 100/120 V PRIM 2xT10A
220/240 V PRIM 2xT8A

6

PAT No. 5.528.417
PAT No. 6.050.530

7

8

1 Only to be operated by trained personnel

2

3

4

Maintenance instructions

- Put a dust cover over the instrument during breaks in work.
- Keep accessories in a dust-free place when not in use.
- Remove dust with a pneumatic rubber pump and a soft brush.
- Clean the objectives and eyepieces with special optics cleaning cloths and pure alcohol.
- Protect the surgical microscope from damp, vapors, acids, alkalis, and corrosive substances.
  Do not keep chemicals near the instrument.
- Protect the surgical microscope from improper handling.
  Install other device sockets or unscrew optical systems and mechanical parts only when explicitly instructed to do so in this user manual.
- Protect the surgical microscope from oil and grease.
  Never oil or grease the guide surfaces or mechanical parts.
- Remove coarse debris with a moistened disposable cloth.
- For disinfecting the surgical microscope, use compounds from the surface disinfecting group based on the following active ingredients:
  aldehydes,
  alcohols,
  quaternary ammonia compounds.

☞ Due to potential damage to the materials, never use substances based on
  halogen splitting compounds,
  strong organic acids,
  oxygen splitting compounds.

☞ Follow the disinfectant manufacturer's instructions.

☞ It is recommended to conclude a service contract with Leica Service.

Cleaning the touch panel

⇨Before cleaning the touch panel, switch off your Leica M525 OH4 and disconnect it from the power supply.
⇨Use a soft, lint-free cloth to clean the touch panel.
⇨Do not apply cleaning agent directly to the touch panel; rather, apply it to the cleaning cloth.
⇨Use a commercially available glass/eyeglass cleaner or plastic cleaner to clean the touch panel.
⇨Do not apply pressure to the touch panel while cleaning it.

☞ The touch panel is resistant to most disinfectants used in the medical field.

⚠ **Caution 23**
Damage to the touch panel
⇨Operate the touch panel using your fingers only. Never use hard, sharp or pointed objects made out of wood, metal or plastic.

⚠ **Caution 24**
Damage to the touch panel
⇨ Never clean the touch panel using cleaners that contain abrasive substances. These substances can scratch the surface and cause it to be become dull.

Maintenance

The Leica M525 OH4 surgical microscope generally requires no maintenance. To ensure that it always operates safely and reliably, we recommend that you take the precaution of contacting the responsible service organization.
Here you can arrange for periodic inspections and, if necessary, conclude a maintenance contract.

☞ It is recommended to conclude a service contract with Leica Service.

☞ Use only original spare parts for servicing.

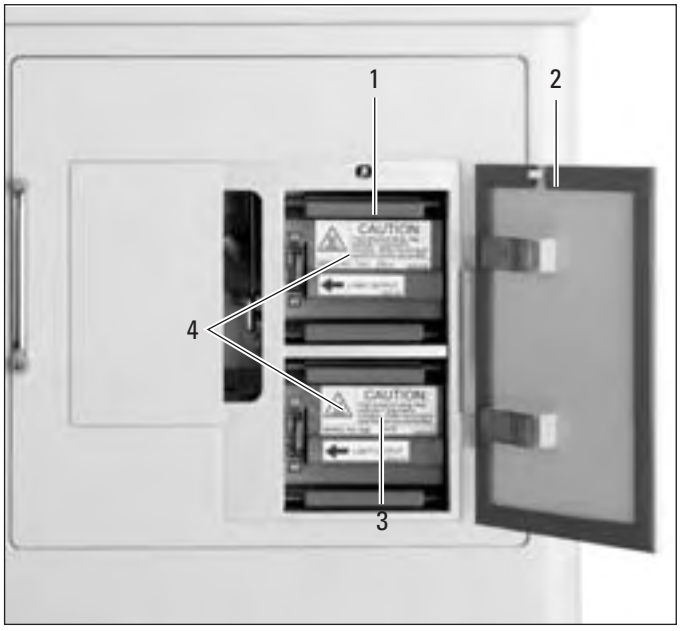
☞ After 18 months you will be reminded that the inspection is due when you switch on the microscope.

This Leica M525 OH4 microscope will function
best if serviced every 18 months.
Please contact your local authorized Leica
Service representative for a preventative
maintenance check.

⇨Press Exit.
The dialog window is closed.

Changing bulbs

⇨Open the access door (2) for lamp inserts.
The illumination push-button (item 2, page 7) flashes orange.



Caution 25
Danger of skin burns!
The lamp insert is very hot.
⇨Before changing the lamp, make sure that the lamp insert has cooled down.

⇨Remove the defective lamp insert (1 or 3) and install a new lamp insert (spare part no. 10 448 022).

When installing the lamp insert, make sure that the arrow (4) is pointing to the left.

⇨Close the access door.
The illumination push-button (item 2, page 7) lights up green.

A dialog window opens when the lamp power drops below the recommend minimum level.

Our sensor shows the Xe lamp you are using
is defective.
We recommend you have the lamp tested by
Leica Service representative or replace it.

⇨Press the "Close" button.
The dialog window is closed.
⇨Replace defective lamps.

Checking the timer for the xenon lamp

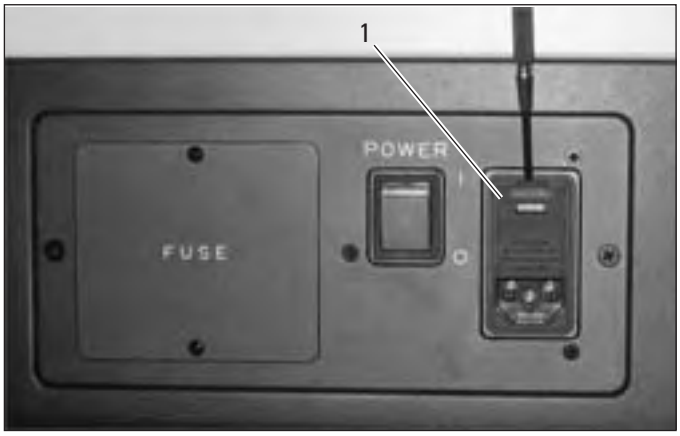
A timer window (5) for the xenon lamp is located on the main illumination fitting. It displays the operating hours of the xenon lamp.

We recommend that a xenon lamp with a remaining useful life of 10% be replaced before commencing an operation.

Changing fuses

Range 220V–240V: two 8A fuses, slow blow
Range 100V–120V: two 10A fuses, slow blow

⇨Remove the cover (1) with a screwdriver.



⇨Remove the fuses (2) from their receptacles and replace them.

Notes on reprocessing of resterilizable products

Products
Reusable products supplied by Leica Microsystems (Schweiz) AG such as rotary knobs, objective protective glasses and capping pieces.

Limitation of reprocessing:
For the medical devices used on patients suffering from Creutzfeldt Jacob Disease (CJD) or suspected of having CJD or variant CJD, the local statutory requirements have to be met. Normally resterilizable products used on this group of patients are to be eliminated without risk by incineration.

Occupational safety and health protection
Particular attention must be paid to the occupational safety and health protection of the persons responsible for preparing contaminated products. Current regulations of hospital hygiene and prevention of infection must be observed in the preparation, cleaning and disinfection of the products.

Limitation of reprocessing
Frequent reprocessing has little effects on these products.
The end of the product life cycle is usually determined by wear and year and damage through use.

Instructions

Workplace
Remove surface contamination with a disposable cloth / paper cloth.

Storage and transport
No special requirements.
It is recommended to perform the reprocessing of a product immediately following its use.

Preparation for cleaning
Remove the product from the Leica M525 OH4 surgical microscope.

Cleaning: manual
Equipment: running water, rinsing agent, spirit, micro-fiber cloth
Procedure:
1. Rinse surface contamination off of the product (temp. <40°C). Use some rinsing agent depending upon degree of contamination.
2. If the optics is heavily contaminated, e.g. finger marks, fat streaks etc., use spirit for cleaning.
3. Dry off products, except for optical components, with a disposable cloth/paper cloth. Dry off optical surfaces with a micro-fiber cloth.

Cleaning: automatic
Equipment: Cleaning/disinfecting device
It is not recommended to clean products with optical components in a cleaning/disinfecting device. In addition, optical components must not be cleaned in ultrasonic baths in order to prevent damage.

Disinfection
The alcohol disinfection solution "Mikrozid, Liquid" may be used in accordance with the instructions on the label.
Please note that optical surfaces must be rinsed thoroughly with fresh drinking water, followed by fresh demineralized water, after disinfection. The products must be dried thoroughly before the subsequent sterilization.

Maintenance
No special requirements.

Control and functional test
Check the snap-on behavior of rotary knobs and CAN handles.

Packaging
Separate: A standard PE bag may be used. The bag must be large enough for the product so that the closure is not under tension.

Sterilization
See Table 1

Storage
No special requirements.

Additional information
None

Contact information of manufacturer
Address of local agent

Leica Microsystems (Schweiz) AG verified that the aforementioned instructions for the preparation of a product are suitable for its reuse. The processing person is responsible for reprocessing with the equipment, materials and personnel and for achieving the desired results in the reprocessing installation. In general, this requires validations and routine monitoring of the process. Every deviation from the supplied instructions should also be examined carefully by the processing person to determine effectiveness and possible detrimental consequences.

Table 1: Sterilization

		Permissible sterilization methods	
Item no.	Designation	Steam (autoclave) 134°C, t > 10min.	Ethylene oxide max. 60°C
10180591	Clip-on handle	X	
10428328	Rotary knob, binoc. tube T	X	
10384656	Rotary knob, transparent	X	
10443792	Lever extension	X	
10429792	Capping piece, slit lamp	X	
10445368	Cover, binoc. tube 0–180°	X	
10445289	Handswitch holder	X	
10446058	Protective glass, multifoc. obj.		X [1)]
10446469	Objective protective glass Leica M680		X [1)]
10446467	Objective protective glass Leica M840/M841		X [1)]
10443714	Rotary ring, objective 0°	X	
10445341	Handle for Leica M655. sterilizable	X	
10445549	Handle for Leica M695	X	
10445340	Cap for Leica M655/M695. sterilizable	X	

[1)] Products with optical components can be steam-autoclaved using the conditions listed above. However, this may lead to the formation of a layer of dots and streaks on the glass surface, which may reduce the optical performance.

General faults

☞ If the equipment is no longer operating properly, please consult your Leica representative.

Fault	Cause	Remedy
The microscope tilts when you press the "All Brakes" button.	The swing arm is not correctly balanced.	⇨Balancing the swing arm (see page 27).
The microscope cannot be moved or moved only with a great deal of effort.	A cable is sticking.	⇨Re-lay the affected cable.
	Leica M525 OH4 locked.	⇨Release the lock (see page 22).
Functions cannot be operated with the footswitch or the control on the CAN handles.	A cable connection has come loose.	⇨Check the power cable. ⇨Check the footswitch connection.
	Incorrect assignment entered at control unit.	⇨Change the assignments on the control unit.
No light in the microscope.	The fiber optic cable has come loose.	⇨Check the optical fiber connection.
	Main illumination and/or backup illumination defective.	⇨Switch to different light source (see page 40).
The image remains unfocussed.	Eyepiece are not mounted correctly.	⇨Screw in the eyepiece completely.
	Diopters not set correctly.	⇨Perform diopter correction exactly as instructed (see page 24).
The microscope or the swing arm moves up/down or rotates by itself.	Swing arm is not correctly balanced.	⇨Balance the Leica M525 OH4 (see page 27).
	Cables are not correctly laid or have slipped out of position and exert force on the system (poss. additional video cable).	⇨Lay the cable in accordance with the installation instructions and provide a strain relief.
	Leica M525 OH4 was balanced in a locked state.	⇨Release the lock (see page 22) and balance the Leica M525 OH4 (see page 27).
Microscope and swing arm are difficult to move or cannot be moved at all.	Automatic balancing was not completed.	⇨Make sure that the microscope is in position B (see page 30). ⇨Press the push-button for Auto Balance again.

What to do if...?

Fault	Cause	Remedy
Automatic balancing cannot be performed.	Microscope is tilted at too great an angle.	⇨Align A/B axes on microscope in parallel (see page 30). ⇨Repeat automatic balancing procedure.
Zoom cannot be adjusted electrically.	Failure of the zoom motor.	⇨Press the Zoom rotary button. ⇨Set the zoom by turning the button (see page 41).
No XY movements are possible at one of the two CAN handles.	No XY movements have been set in the control unit for the CAN handles.	⇨Set the joystick to XY movement (see page 50).
The microscope has not been balanced exactly in the B-axis.	Installed accessory was not turned back to the working position when balancing the B axis.	⇨Balance the B-axis again. Make sure that the accessory is turned back to the working position when balancing the B-axis (see page 28). Perform intraoperative B/C balancing (see page 30).
The push-button for automatic balancing is flashing, but the acoustic signal is not sounding (nothing is happening).	Balancing process still not complete.	⇨Rotate the microscope to the B-position and press the Autoblance push-button.
Swing arm cannot be moved.	Swing arm locked in position.	⇨Release the lock (see page 22).
The stand of the Leica M525 OH4 moves.	Footbrake not applied.	⇨Lock the footbrake in position (see page 35).
The range of movement of the Leica M525 OH4 is limited (swing, tilt, rotate, XY movement).	Cable laid too tightly.	⇨Re-lay the cable (see assembly instructions Leica M525 OH4).
	Video camera was not correctly mounted and touches the swing arm.	⇨Mount the video camera correctly.
Leica M525 OH4 is not correctly balanced.	Position of accessory was changed after balancing.	⇨ Balance the Leica M525 OH4 (see page 27). ⇨Perform intraoperative AC/BC balancing of the Leica M525 OH4 (see page 30).

Fault	Cause	Remedy
Leica M525 OH4 cannot be balanced.	The weight disk which you are using on the D-axis cannot balance installed accessories.	⇨Changing the weight disk on the D axis (see page 33).
	Leica M525 OH4 was balanced in the transport position.	⇨Move the Leica M525 OH4 out of the transport position and balance it again.
Focus on microscope cannot be adjusted.	Multifocus switch is "on".	⇨Switch off the multifocus (see page 42). Exception: you are using a laser micromanipulator which has this function as a safety precaution.
The image appears shaded through the microscope at the edges and the illumination field is outside the field of vision.	Accessories not installed exactly.	⇨Install the accessories exactly in the holders (see page 22).

TV, photography

Fault	Cause	Remedy
Photographs/TV pictures unfocussed.	Microscope or Zoom Video Adapter not precisely focussed.	⇨Focus precisely, insert graticule if necessary. ⇨Perform diopter correction exactly as instructed.
	Zoom Video Adapter is not set parfocal.	⇨Set the Zoom Video Adapter parfocal as instructed.
The photographs have a blue tone.	An incorrect film was used.	⇨Load daylight film.

Error messages on the control unit

Fault	Cause	Remedy
"Check lamp 1/2"	Lampe 1/2 is defective.	Check and replace defective lamp 1/2 after surgery.
"Device not present"	A cable connection has loosened or is defective.	Contact your Leica represantative.
"No Connection to MDRS3"	A cable connection has loosened or is defective.	Chek connection cable.
"Rear load too high"	Mounted accessories cannot be be balanced.	Reduce Load on back side of optics carrier.
"Front load too high"	Mounted accessories cannot be be balanced.	Reduce Load on front side of optics carrier.
"Rear load too high"	Mounted accessories cannot be be balanced.	Reduce Load on back side of optics carrier.
"Front load too high"	Mounted accessories cannot be be balanced.	Reduce Load on front side of optics carrier.
"Left hand side load too high"	Mounted accessories cannot be be balanced.	Reduce Load on left side of optics carrier.
"Rught hand side load to high"	Mounted accessories cannot be be balanced.	Reduce Load on right side of optics carrier.
"Too many counterweight wheels at D axis"	Wheel counterweight used on the D axis cannot compensate for the mounted accessories	Change wheel counterweight on the D axis (see page 34)
"Too less counterweight wheels at D axis"	Wheel counterweight used on the D axis cannot compensate for the mounted accessories	Change wheel counterweight on the D axis (see page 34)
"Illumination unit not closed"	Access hatch for lamp inserts is not closed.Pushbutton for illumination flashes.	Close access hatch and lock with rotary knob.
"Microscope-Device-Controller not present"		Contact your Leica represantative.

Electrical data

Power connection for Leica M525 OH4	1600 VA 50/60 Hz 100 V (+10%/–15%) 120 V (+10%/–15%) 220 V (+10%/–15%) 240 V (+10%/–15%)
Protection class	Class 1

Leica M525

Microscope

Magnification	6:1 zoom, motorized
Working distance	207mm – 470mm, variable through motorized multifocal lens, continuously adjustable; manually adjustable override
Focusing	Motorized via multifocal lens; manually adjustable
Eyepiece	Wide-field eyepieces for spectacle wearers 10x and 12.5x dioptric settings ±5 with adjustable eye cup
Objective	Multifocal lens; 207–470mm variable working distance, with optional WD extender lens
Illumination	Illumination system specially developed for microsurgical applications; continuously adjustable illumination field diameter with Gauss-shaped light distribution. Continuously adjustable brightness at constant color temperature
AutoIris™	Built–in automatic zoom-synchronized illumination field diameter, with manual override and reset feature
Main light source	High performance 300 Watt xenon arc-lamp through fiber optic
Emergency lamp	300 Watt xenon arc-lamp on separate electrical system
BrightCare™	Safety technology for the working distance synchronized to light control

Optical data

Magnification range	1.2x – 12.8x with 10x eyepiece
Field of view (dia. in mm)	16.5mm – 180mm with 10x eyepiece

Microscope carrier

Rotation of optics	540°
Lateral tilt	50° to left / 50° to right
Inclination tilt	–30° / +120°
XY speed	Zoom linked XY speed
Balancing	A,B,C and D axes fully automatic, each can be corrected manually
Intraoperative balancing	AC/BC button for automatic intraoperative balancing of A&C axes and for B&C axes
Brakes	1 brake for A/B axis 1 brake for C axis
Indicator	LED for Fluorescence mode status, LED for Video record status

Accessories

Leica ULT500	180° stereo observer, Main/Assistant surgeon 40% each beam path Assistant /Video on selectable side 20% each beam path
Dual stereo attachment	Main surgeon 70% / Assistant 30%
Second observer	Stereo attachment for second observer to beam splitter
Beam splitter	50% / 50%, 70% / 30%
Binocular tube	Variable angle 30° – 150°, variable angle 0° – 180°
Video Adapter	3:1 zoom, 35mm – 100mm focal length, c-mount, with fine focus
Imaging	Leica DI C500 high resolution true color dual imaging module for correlated and non correlated data display
Asepsis	Sterilizable protective glass cover for the objective, sterilizable components for various controls, commercially available drapes
Laser	Various commercially available lasers and laser shutters can be attached

IGS

Interface / Compatibility	Open architecture for IGS systems

Fluorescence

Vascular Fluorescence	Optional Leica FL800 is available in USA, EU, and most countries
Oncology Fluorescence	Optional Leica FL400 available in EU and some other countries (Please check the status of approval with your Leica representative).

Floor stand

Type	Floor stand with six electromagnetic brakes
Base	720mm x 720mm with four 360° rotatable casters with 130mm diameter each, one central single step foot brake
Balancing	New "no brake release" Auto-Balance: One button / two push for complete automatic balancing of stand and optics
Intraoperative Balancing	AC/BC button for automatic intraoperative balancing of the AC axis and for BC axis
Swingarm	Patented advanced movement system for perfect balance in six axes, new vibration damping technology
Floorstand control unit	New generation touch panel technology. The latest electronics control for the continuous governing of all motor functions and the light intensity. Data shown by means of LCD. Built-in BrightCare™ technology for the working distance synchronized light control. ISUS ™ Intelligent Setup System, Menu selection based on unique software for user-specific configuration, with built-in electronic auto-diagnosis and user support.
Control unit stand	Software independent hard keys for illumination and auto-balancing. Indicator for Main / backup illumination and Fluorescence modes, Open architecture for future software developments.
Light source	Dual Xenon arc-lamp illumination system and built in automatic lamp quick changer
Controls	10 function pistol grips for zoom, focus, all-free release of six brakes, side button for user-defined brakes, motorized lateral tilt and inclination (XY) or Leica DI C500 functions. Except for the all-free button all functions are freely programmable. Mouthswitch for releasing the user defined brakes 12 function foot control and handswitch
Integration of documentation	Prepared for integration of Video- and digital recording systems. Open architecture
Connectors	Numerous built-in connectors for Video, IGS and control data transfer, Internal Power 12 VDC, 19 VDC and AC connections
Carrier for monitor	700mm long and flexible arm with 4 axis for rotation and inclination to carry optional video monitor
Materials	All solid metal construction
Surface coating System	Coated with antimicrobial paint
Minimum height	In park position 1945mm
Range Cantilever	Max. 1925mm
Load	Min. 6.7kg and max. 12.2kg of accessories to the microscope
Weight	Approx. 320kg with full load

Ambient conditions

In use	+10°C to +40°C +50°F to +104°F 30% to 95% rel. humidity 500mbar to 1060mbar atmospheric pressure
Storage	–40°C to +70°C –40°F to +158°F 10% to 100% rel. humidity 500mbar to 1060mbar atmospheric pressure

Standards fulfilled

Conformity CE

- Directive 93/42/EEC concerning medical devices: Class I, in conformity with Annex IX, Regulation 1, with reference to Regulation 10 and 12 of the directive.
- Medical electric equipment, Part 1: General requirements for safety IEC 60601-1; EN 60601-1; UL60601-1; CAN/CSA-C22.2 NO. 601.1-M90
- Electromagnetic compatibility IEC 60601-1-2; EN 60601-1-2
  According to the SQS Certificate, the Business Unit SOM, within Leica Microsystems (Schweiz) AG, holds the management system certificates for the international standards ISO 9001:2000 /ISO 13485:2003 and ISO 14001:2004 relating to quality management, quality assurance and environmental management.

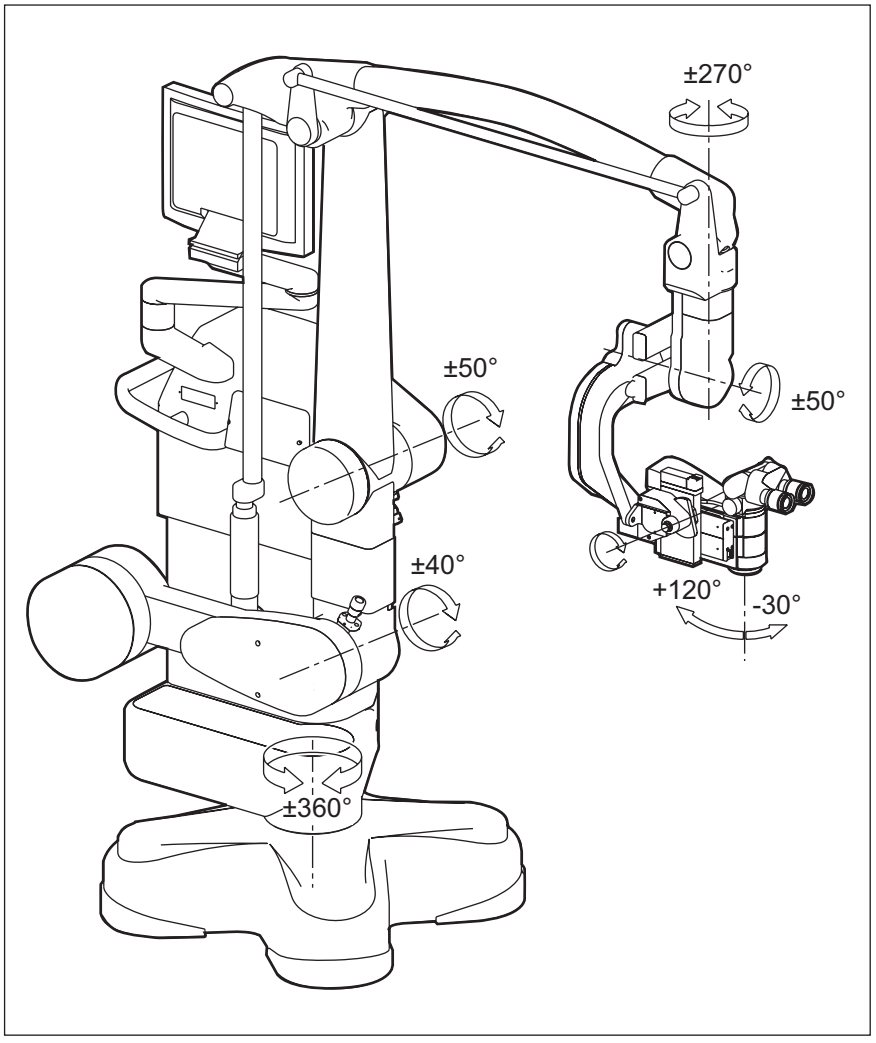
Limitations of use

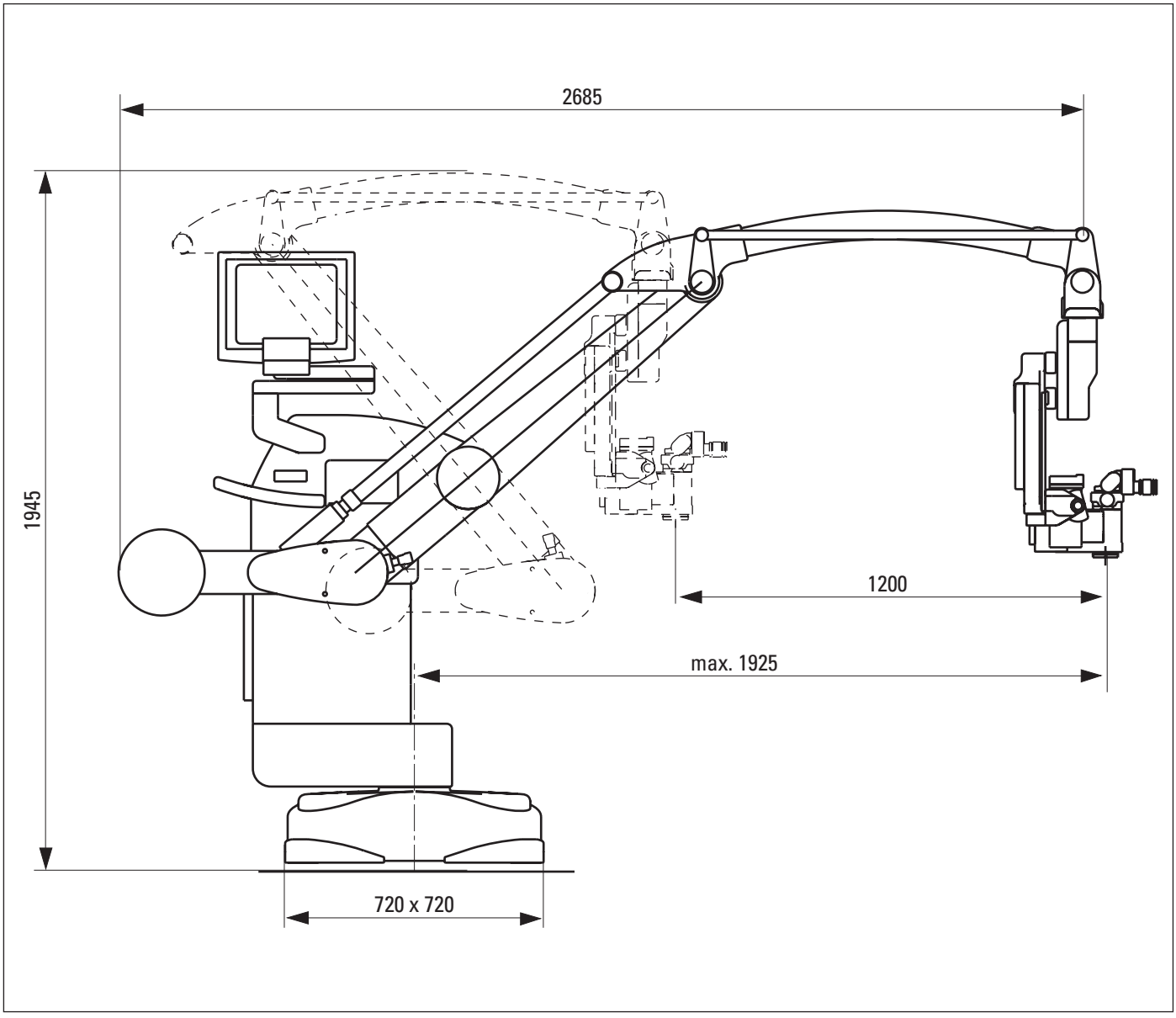
The Leica M525 OH4 may be used only in closed rooms and must be placed on a solid floor.

List of weights of balanceable configurations

			Minimum specification		US standard		Maximum specification		Maximum specification Fluorescence	
Leica Art. No.	**Designation**	**Unit weight (kg)**	**Qty.**	**Gross weight (kg)**	**Qty.**	**Gross weight (kg)**	**Qty**	**Gross weight (kg)**	**Qty.**	**Gross weight (kg)**
10446570	Counterweight, M500	2.900	1	2.900		0.000		0.000		0.000
10455349	30° rotary ring	0.184	1	0.184		0.000		0.000		0.000
10446058	Multifocal protective glass	0.017	1	0.017	1	0.017	1	0.017		0.000
10446587	Binocular tube, straight, T, Type II	0.795		0.000		0.000		0.000		0.000
10446797	Binocular tube tiltable, 30–150°	0.795	2	1.590	3	2.385	3	2.385	2	1.590
10446574	Binocular tube tiltable, T, Type II	0.700		0.000		0.000		0.000		0.000
10446485	Eyepiece size 10x/21B, Type II	0.100	4	0.400	6	0.600	6	0.600	6	0.600
10446482	Beam splitter M500, 50/50% light distribution	0.360	1	0.360		0.000		0.000		0.000
10446475	Stereo assistant's attachment, M500	0.920	1	0.920	1	0.920	1	0.920	1	0.920
10446573	Binocular tube, tiltable, 0–180°, T, Type II	1.400		0.000		0.000		0.000	1	1.400
10446592	Zoom video adapter	0.720	1	0.720	1	0.720	1	0.720		0.000
	Video camera	0.360	1	0.360	1	0.360	1	0.360		0.000
10446852	DI-Color Module (DI C500)	4.140		0.000		0.000	1	4.140	1	4.140
10446854	Ultra Observer (ULT500)	3.020		0.000	1	3.020		0.000		0.000
10713669	NIR Dual Video Adapter incl. objective	1.240		0.000		0.000		0.000	1	1.240
	UV camera handle	0.100		0.000		0.000		0.000	1	0.100
10713897 10713667	Sony NIR camera	0.040		0.000		0.000		0.000	1	0.040
10713680	Observation filter module	0.500		0.000		0.000		0.000	1	0.500
10713648	FL illumination module incl. adapter plate	0.840		0.000		0.000		0.000	1	0.840
10446469	M680 sterile glass	0.060		0.000		0.000		0.000	1	0.060
	Gross weight			**7.451**		**8.022**		**9.142**		**11.430**

Illustrations of measure

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1945
1200
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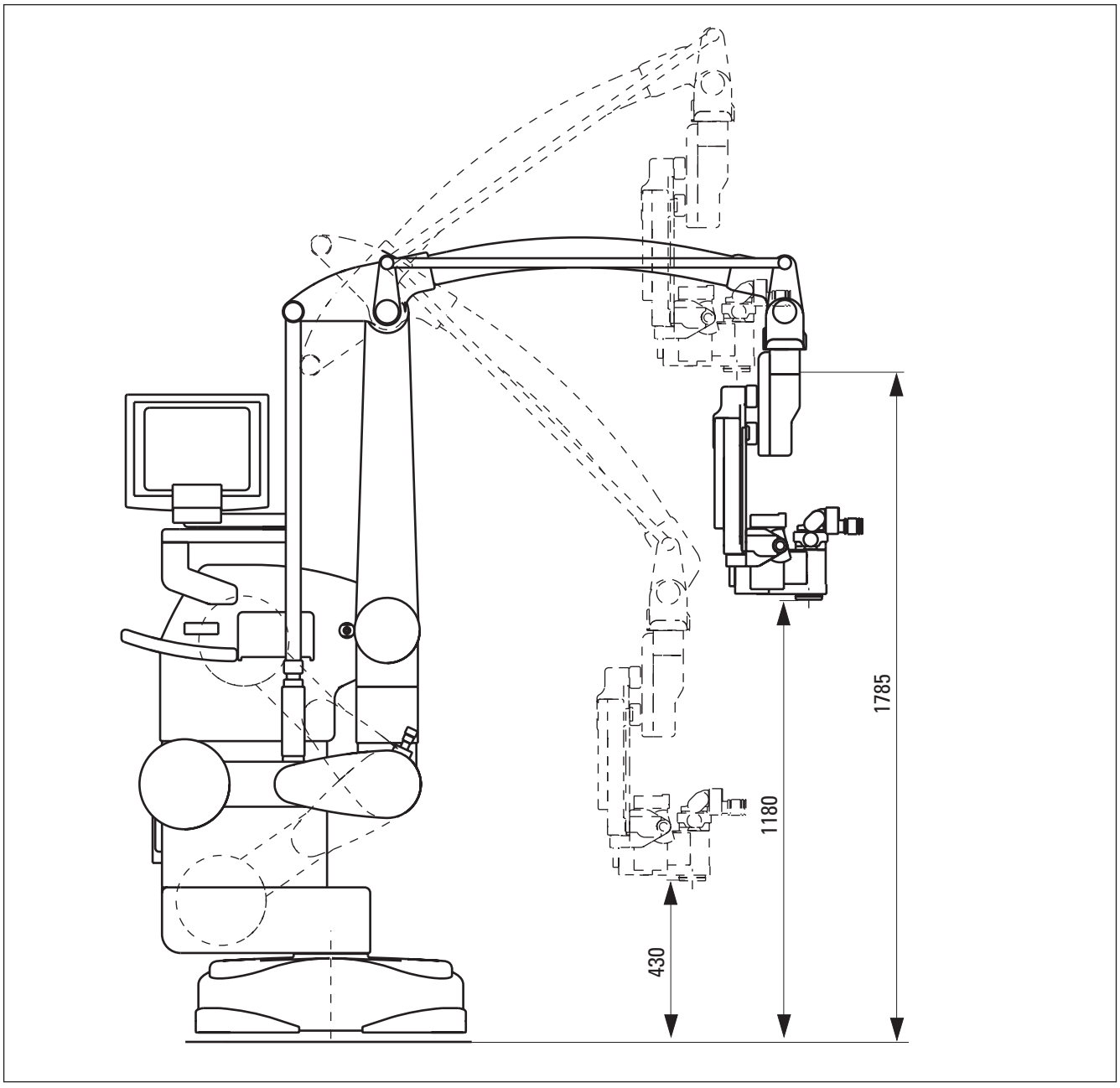
1785
1180
430

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Leica Microsystems' mission is to be the world's first-choice provider of innovative solutions to our customers' needs for vision, measurement and analysis of microstructures.

Leica, the leading brand for microscopes and scientific instruments, developed from five brand names, all with a long tradition: Wild, Leitz, Reichert, Jung and Cambridge Instruments. Yet Leica symbolizes innovation as well as tradition.

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The Business Unit SOM, within Leica Microsystems (Schweiz) AG, holds the management system certificates for the international standards ISO 9001:2000 / ISO 13485:2003, and ISO 14001:2004 relating to quality management, quality assurance and environmental management.

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MICROSYSTEMS

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Leica M525 OH4

Assembly instructions

10 714 368 – Version A

Leica
MICROSYSTEMS

Contents 2

General safety measures 4

Preparations 6

Components list 8

Assembly 9

Disassembly 30

Checklist 30

Starting up 31

Delivery report 33

Page

General safety measures 4
Intended use of instrument 4
Information for the person responsible for the instrument 4
Information for the user 4
Disposal 4
Symbols in this assembly manual 4
Notes on assembly 4
Inward-goods inspection 5
Safety precautions in these assembly instructions 5

Preparations 6
Unpacking the transport container 6

Components list 8

Assembly 9
Mounting the stand OH4 9
Mounting the weights 10
Mounting the removable wheel counterweights and cover 11
Mounting the microscope carrier 12
Mounting the optics carrier 15
Checking and setting the voltage 19
Inserting the lamps 20
Mounting the Leica MDRS (optional) 21
Installing and connecting the fluorescence components (optional) 25

Disassembly 30

Checklist 30

Starting up 31
Balancing out the Leica M525 OH4 31
Checking mobility 31
Carrying out functional tests 31
Inspection and acceptance sequence 32

Delivery report of the Leica M525 OH4 surgical microscope . . 33

These assembly instructions contain important safety precautions as well as information on setting up the instrument.

Before attempting to assemble or start up the product read carefully through the assembly instructions.

Intended use of instrument

- The Leica M525 OH4 surgical microscope system is an optical instrument that uses magnification and illumination to improve the display of objects.
- It can be used for observation, documentation as well as in human and veterinary surgery.
- The Leica M525 OH4 surgical microscope system may only be used in closed rooms and beneath a strong ceiling.

Information for the person responsible for the instrument

- Ensure that the surgical microscope is used only by qualified personnel.
- Carry out regular inspections to make sure the personnel is complying with safety requirements.
- Brief the user thoroughly and explain the meaning of the hazard signs and safety precautions.
- Allocate responsibilities for start-up, operation and maintenance. Monitor compliance with this.
- Do not use the Leica M525 OH4 surgical microscope system unless it is in perfect condition.
- If any faults develop which might put the safety of people at risk, report this to your Leica representative immediately or to Leica Microsystems (Schweiz) AG, CH-9435 Heerbrugg.
- The effect of the Leica M525 OH4 surgical microscope on other instruments has been tested as specified in EN 60 601-1-2. The system has passed the tests relating to emissions and immunity. Respect the usual precautionary and safety measures relating to electromagnetic and other forms of radiation.
- Any liability for the functioning of the installation will always be the liability of the owner or operator of the installation should it have been incorrectly installed by persons not so commissioned by Leica Microsystems (Schweiz) AG.

Information for the user

- If you use accessories from another manufacturer with the Leica M525 OH4 surgical microscope system, make sure that this manufacturer confirms that the combination is safe to use. Follow the instructions in the user manual in question.
- Follow the instructions given in this manual.
- Follow the instructions given by your employer regarding the organization of work and safety at work.
- Modifications must not be made to the Leica M525 OH4 surgical microscope system.

Disposal

- The relevant national statutory provisions shall apply to the disposal of the products.

Symbols in this assembly manual

The symbols used in these assembly instructions have the following meaning:

Warning
This indicates a potentially hazardous situation that could result in death or serious injury.

Caution
This indicates a potentially hazardous situation that could result in minor or moderate injury but possibly considerable material, financial or environmental damage.

Usage information: Information provided to help the user use the product technically correctly and also efficiently.

⇨ Action required: This symbol indicates that you need to perform a specific action or series of actions.

Notes on assembly

- The mounting frame may only be assembled by an authorized specialist construction company.
- The ceiling mount may only be assembled by authorized specialists.
- The electrical supply may only be connected by an authorized specialist company.

Inward-goods inspection

Damaged goods reduce the safety level.
The use of damaged products can cause severe injury.
Check the packaging and goods for transport damage:

- The transport container should be undamaged.
- The delivery as listed in the order folder should be complete.
- The optional accessories as listed in the order folder should be complete.
- The user manual should be present.
- All of the components shown in the configuration diagram should be present.

If damage has occurred, have the safety of the goods inspected by the Leica service workshop before using them.

Safety precautions in these assembly instructions

Caution
Damage to microscope if the screws are tightened excessively!
⇨Avoid the use of excessive force when tightening all screws.
⇨Set the torque wrench to the tightening torque specified. Apply the wrench until this tightening torque is reached (signaled by a clicking noise). Do not tighten further.

Warning
Risk of severe personal injury when the stand moves in an uncontrolled manner!
⇨Lock the footbrakes during the mounting process.

Caution
Microscope can be damaged by jammed cable!
⇨Ensure that no cable is jammed between the cover and the microscope carrier.

Caution
Risk of injury by falling wheel counterweight or cover!
⇨During the change, ensure that your feet are not under the wheel counterweight or the cover.

Warning
Risk of injury by movements of the microscope during balancing out!
⇨Ensure that no one is in the direct vicinity of the microscope while balancing it out.

Unpacking the transport container

Contents

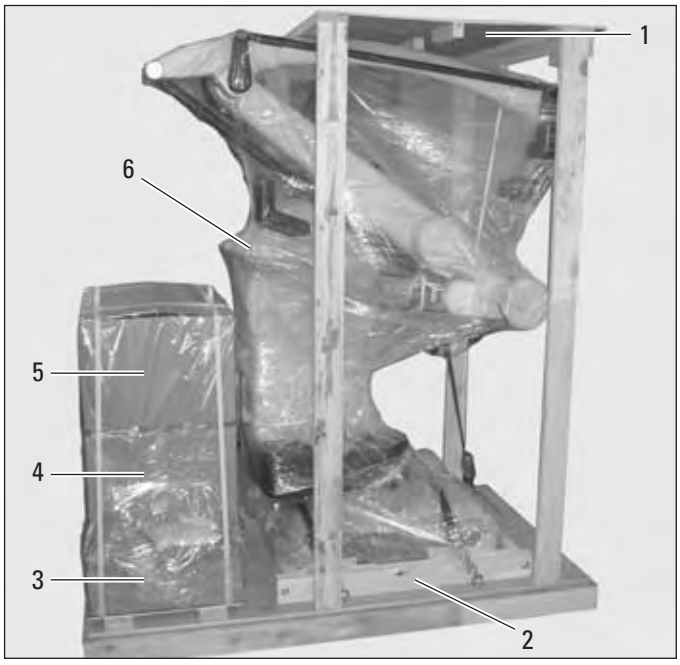

Fig. 1

1 Ramp
2 Fastening plank
3 Crate with weights
4 Crate with
- Handgrips
- Xenon illumination unit
5 Crate with microscope carrier
6 Stand OH4

⇨Remove the carton package of the transport container upwards.
⇨Remove the plastic film and cords.
⇨Unscrew the four screws (7) and remove the ramp (1) (Fig. 2).

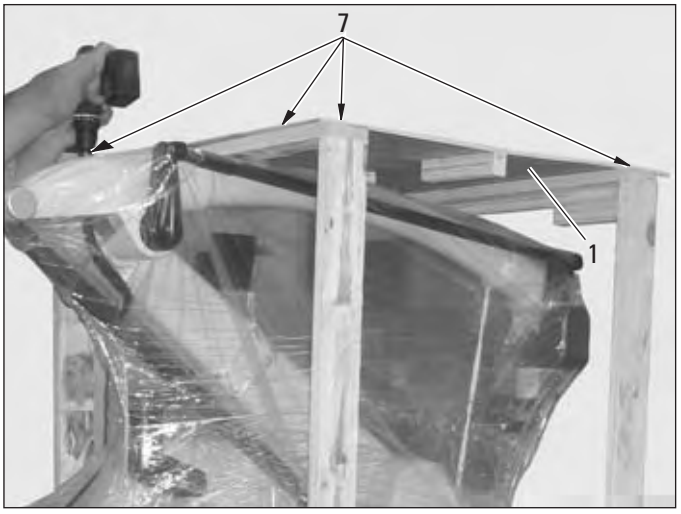

Fig. 2

⇨Remove the fastening belts.

☞ Do not remove the packaging material of the stand before it is no longer positioned on the pallet.

⇨Remove the fastening plank (2) at the base of the stand.

⇨Place the ramp (1) before the pallet and move the stand down carefully (Fig. 1)

Fig. 1

⇨Remove the packaging material of the stand.

☞ Do not yet remove the packaging material from the stand base.

☞ Have the following tools and materials ready before you start assembling the Leica M525 OH4 surgical microscope.

☞ You will need assistance for some of the work.

Accessories supplied

- All screws and nuts
- 2 piece reserve fuses 8 A and 10 A each
- 2 heavy and 3 light wheel counterweights

Tools

- Screwdriver for Philips screws (Size 00)
- Socket wrench with T grip (17 mm)
- 1 set of Allen keys
- Open-ended wrench 22 mm
- Screwdriver with grip for Allen screws (size 2.5 mm)

Assembly material

- Cable ties

Tightening moments for hexagon screws

⚠ **Cautiont**
Damage to microscope if the screws are tightened excessively!

⇨Avoid the use of excessive force when tightening all screws.

⇨Set the torque spanner to the specified torque. Apply the wrench until this torque is reached (signaled by a clicking noise). Do not tighten further.

1 Locking knobs
2 Access hatch for lamps
3 Cover for power fuses
4 Cover for system fuses

5 Vertical arm
6 Cover
7 Right handgrip
8 Optics carrier
9 A sledge
10 Left handgrip
11 Microscope carrier
12 Footbrake
13 Cover for removable wheel counterweights
14 Front counterweight
15 Rear counterweight
16 Stop for swing arm

Mounting the stand OH4

Mounting the stop for the swing arm

Warnuig
Risk of severe personal injury when the stand moves in an uncontrolled manner!
⇨Lock the footbrakes during the mounting process.

⇨Push the OH4 stand to the mounting site.
⇨Lock the footbrake.
⇨Position the vertical arm vertically.
⇨Tighten the stop (1) (Fig. 1).

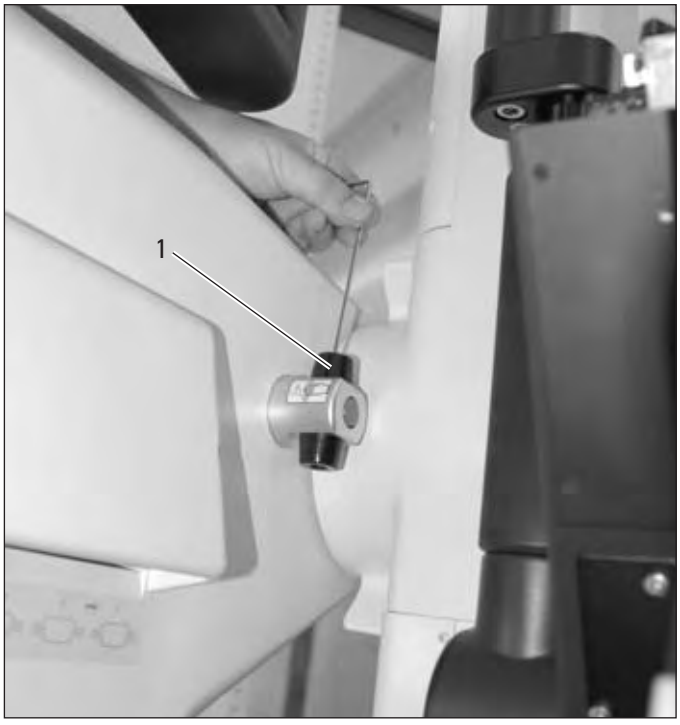

Fig. 1

⇨Remove the adhesive strip from the socket (2) (Fig. 2).

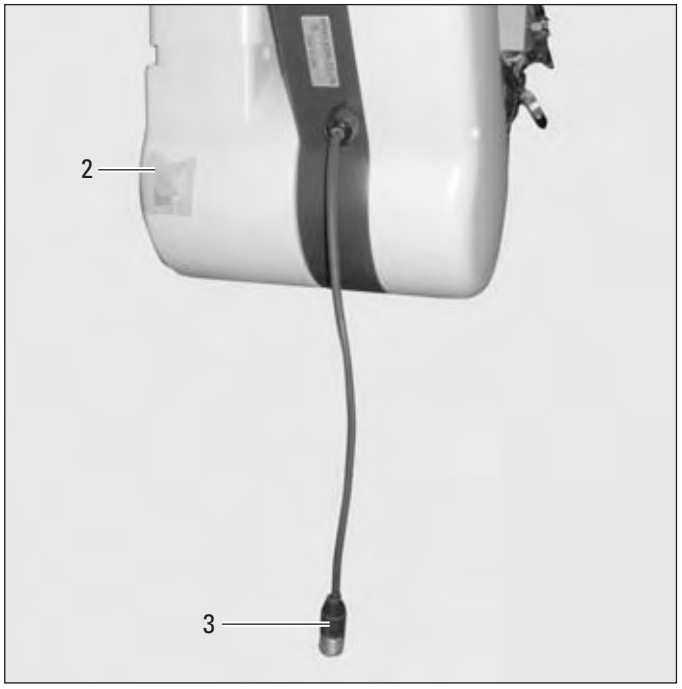

Fig. 2

⇨Plug the connector (3) into the balancing unit (Fig. 3).

Fig. 3

Mounting the weights

⇨Lock the Leica M525 OH4 using the locking knobs (2).

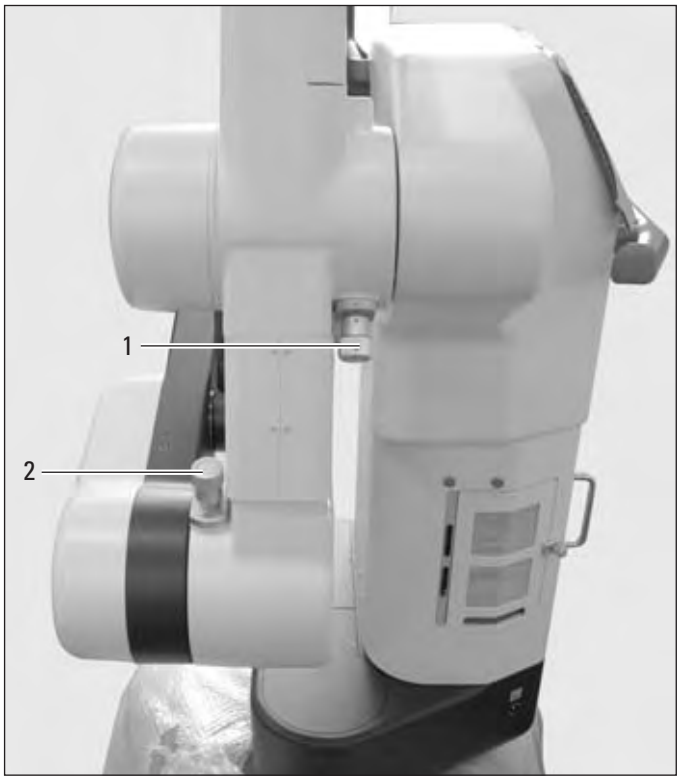

Fig. 1

⇨Pull out and turn the locking knobs until both points (arrows) are aligned.

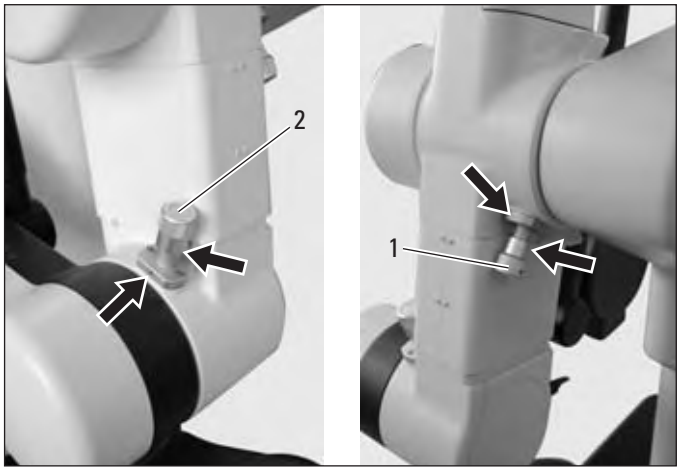

Fig. 2

⇨Move the swing arm up and down until the lock (2) engages.
⇨Move swing arm forward and backward until the lock (1) engages.

Caution
Danger of injury through falling wheel counterweights!
⇨During the change, ensure that your feet are not under the wheel counterweight.

⇨Mount the front wheel counterweight (3) by means of two hexagon nuts M10 (4) (tightening torque 30 Nm) (Fig. 3).

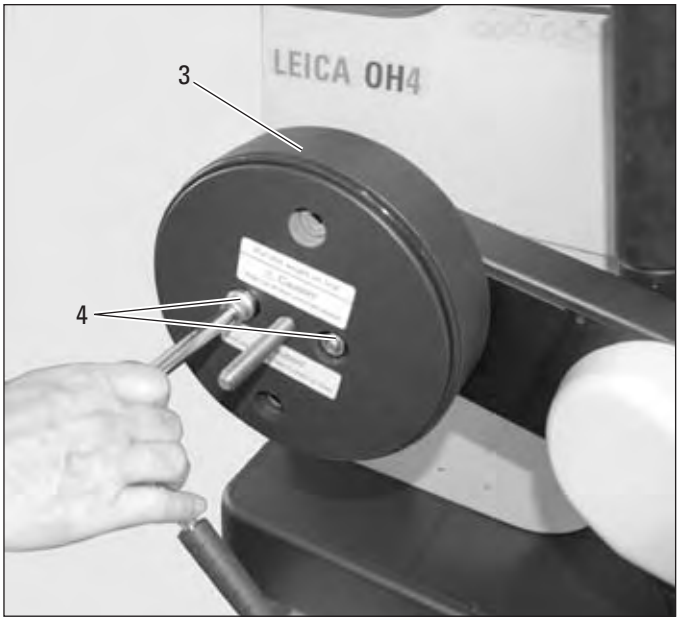

Fig. 3

⇨Mount the rear wheel counterweight (5) by means of two hexagon nuts M10 (6) (tightening torque 30 Nm) (Fig. 4).

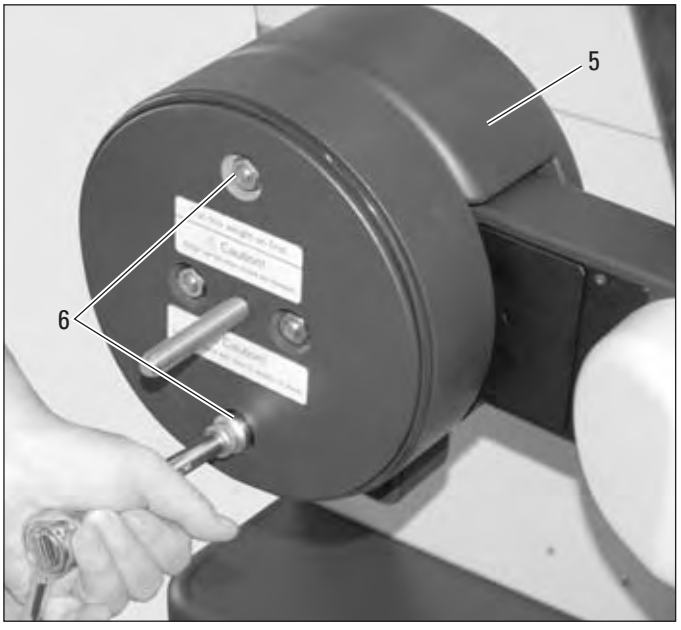

Fig. 4

Mounting the removable wheel counterweights and cover

Caution
Risk of injury by falling wheel counterweight or cover!
⇨During the change, ensure that your feet are not under the wheel counterweight or the cover.

Depending on the accessories used, wheel counterweights (1) have to be added or removed.

Number of wheel counterweights		Load Optics carrier	
Thick	Thin	Min.	Max.
2	0	6.7	10.0
2*	1	7.3	10.8
2	3	8.6	12.2

*Standard configuration

⇨Place the counterweights (1) on and tighten the hexagon nuts (2) (Fig. 1).

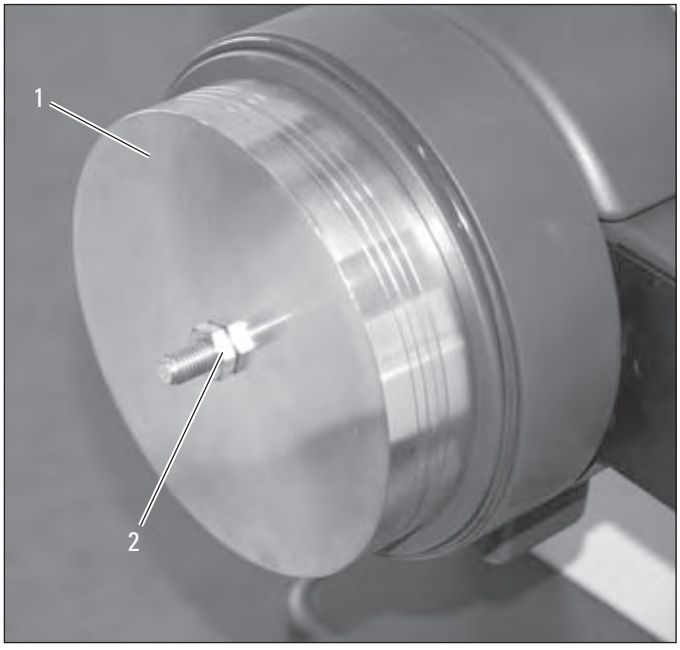

Fig. 1

⇨Screw the cover (3) onto the threaded rod and tighten it (Fig. 2).

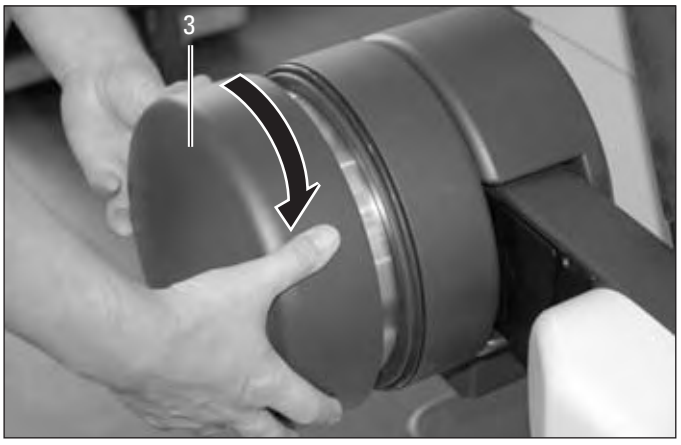

Fig. 2

Mounting the microscope carrier

⇨Unscrew the cover (1) on the microscope carrier (Fig. 1).

Fig. 1

⇨Unscrew the cover (2) on the microscope carrier (Fig. 2).

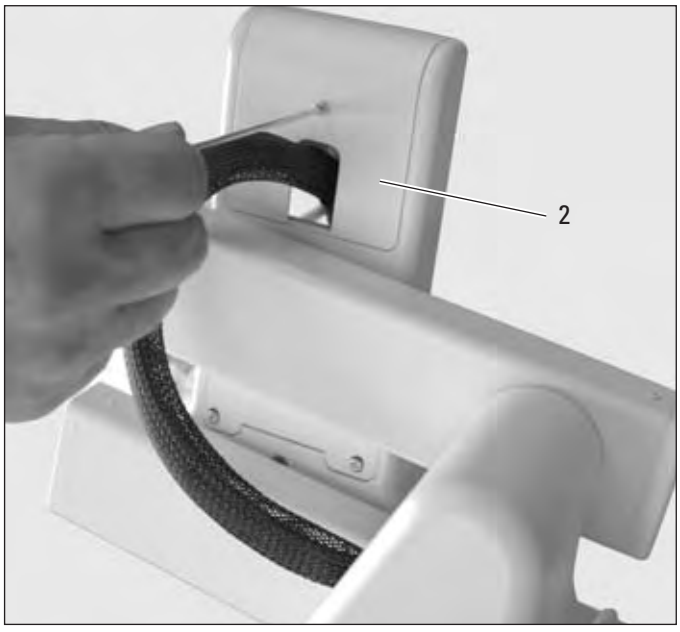

Fig. 2

⇨Suspend the microscope carrier from the 2 threaded bolts (3) and the offset pin (4) (Fig. 3).

⇨Screw tight with two special fixing nuts M10 (conic rear) (5) (torque 26 Nm).

Fig. 3

⇨Insert the fiber-optics light guide (6) through the microscope carrier (Fig. 4).

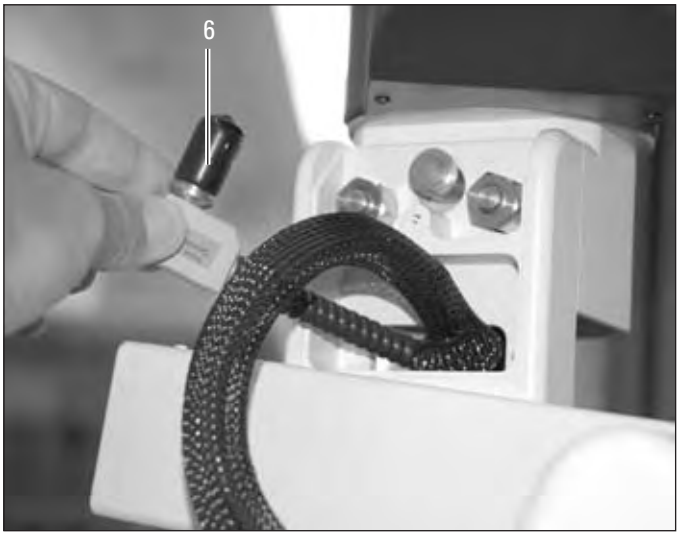

Fig. 4

⇨Unscrew the 2 covers (1 and 2) on the microscope carrier (Fig. 1).

Fig. 1

☞ The lengths specified on the label for the fiber-optics light guide and the video cable apply from the black line (5).

⇨Lay the fiber-optic light guide (3) in accordance with Fig. 2 and fasten it with the holding brackets (4) (Fig. 2).

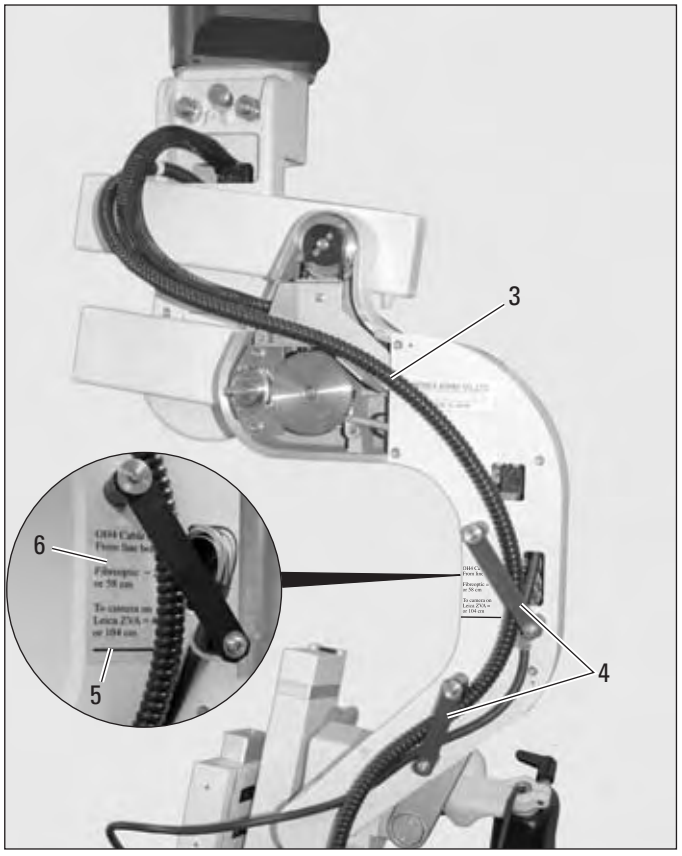

Fig. 2

⇨Screw the 2 covers (1 and 2) on the microscope carrier back on (Fig. 1).

Establishing electrical connections

⇨Connect the connector and socket (1) to each other and cover with the plastic sleeve (Fig. 1).

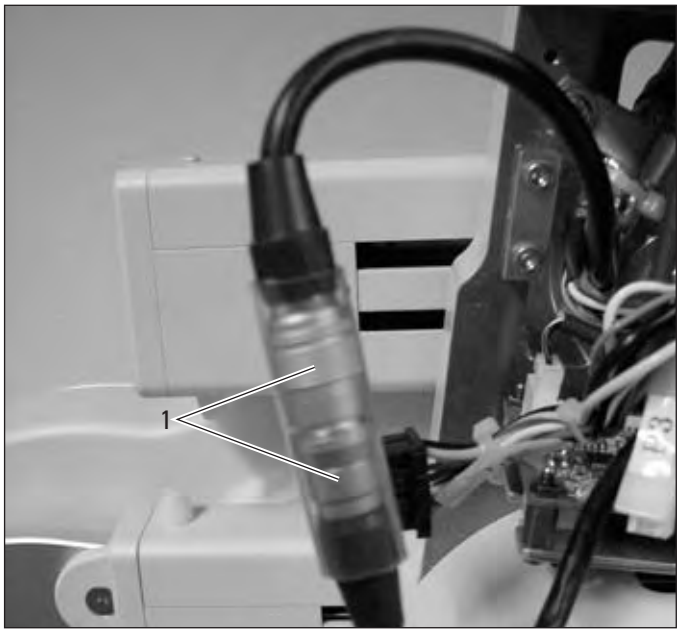

Fig. 1

⇨Plug in the connectors P3 (2) and P1 (3) (Fig. 2).

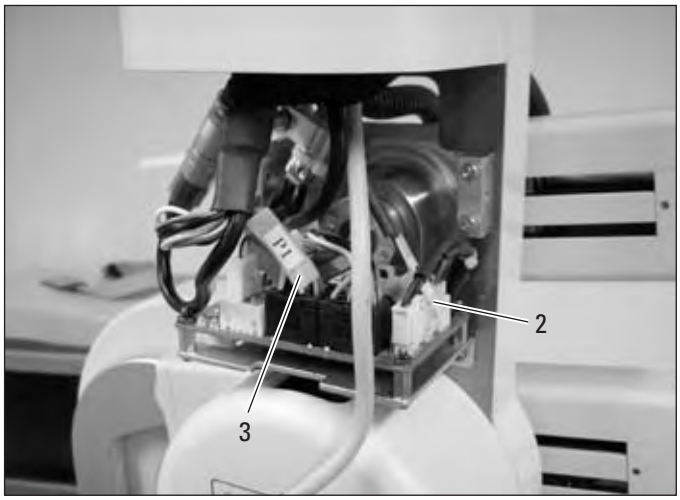

Fig. 2

⇨Insert the connector (4) at the housing cover and insert the connector (5) at the microscope carrier (Fig. 3).

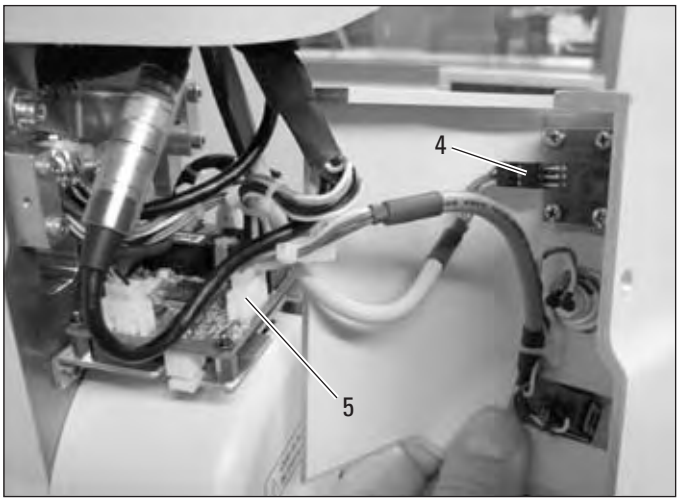

Fig. 3

Caution
Microscope can be damaged by jammed cable!
⇨Ensure that no cable is jammed between the cover and the microscope carrier.

⇨Fasten the cover (6) by means of 2 screws to the microscope carrier (Fig. 4).

Fig. 4

⇨Fasten the cover (1) on the microscope carrier (Fig. 1).

Fig. 1

Mounting the optics carrier

⇨Remove the adhesive strips (3) at the A sledge of the optics carrier (Figures

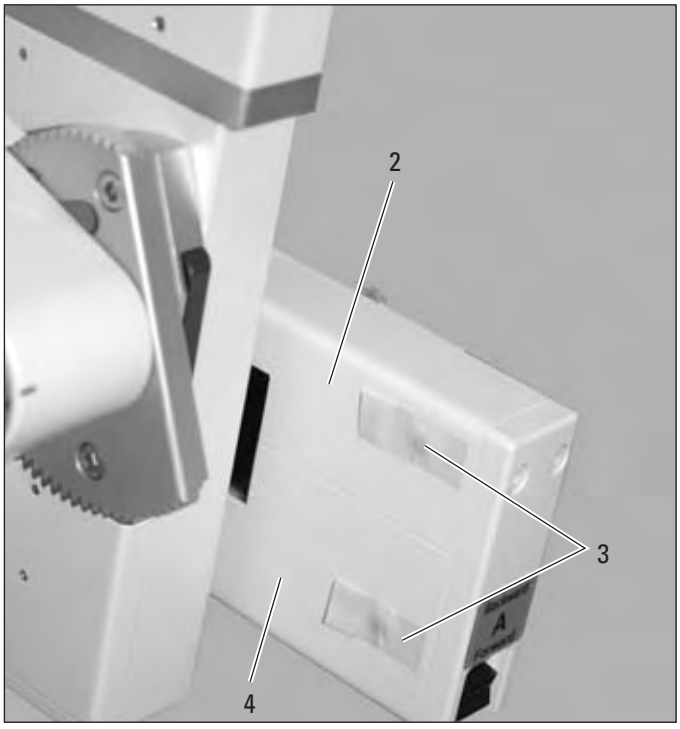

Fig. 2

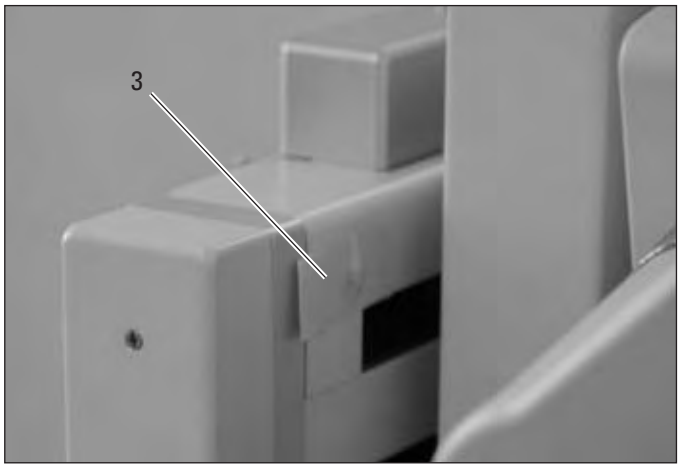

Fig. 3

⇨Unscrew the covers (2, 4 and 5) (Figures 2 and 4).

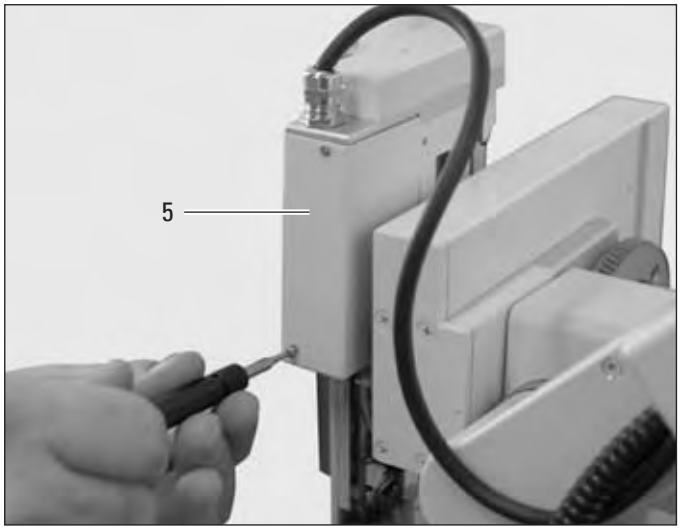

Fig. 4

⇨Hang the optics carrier in (Fig. 5).

Fig. 5

⇨Fasten the optics carrier by means of 3 screws M5 x 15 (1, 2 and 3) to the microscope carrier (Figures 1, 2 and 3).

☞ Do **not yet** tighten the 3 screws (1, 2 and 3).

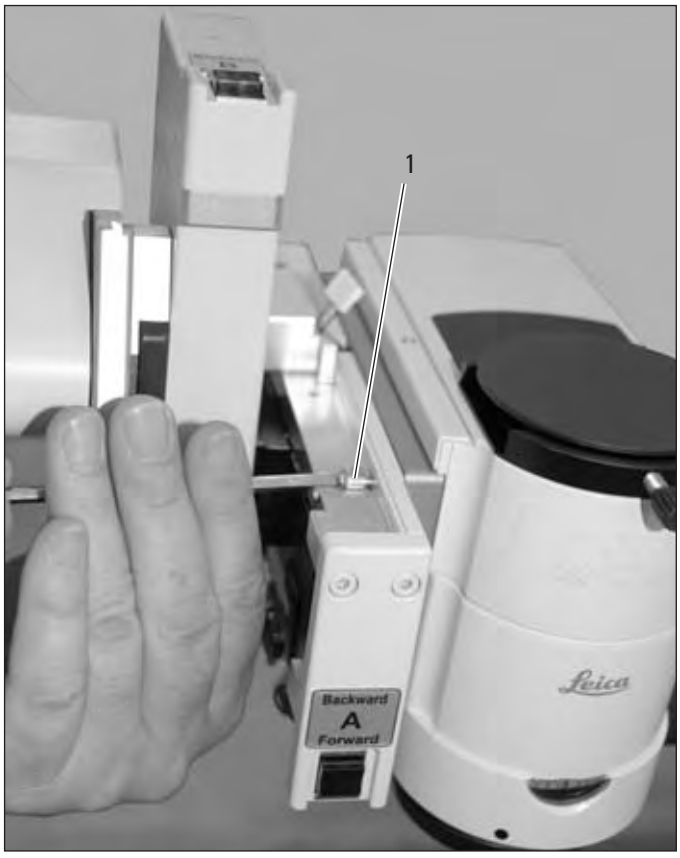

Fig. 1

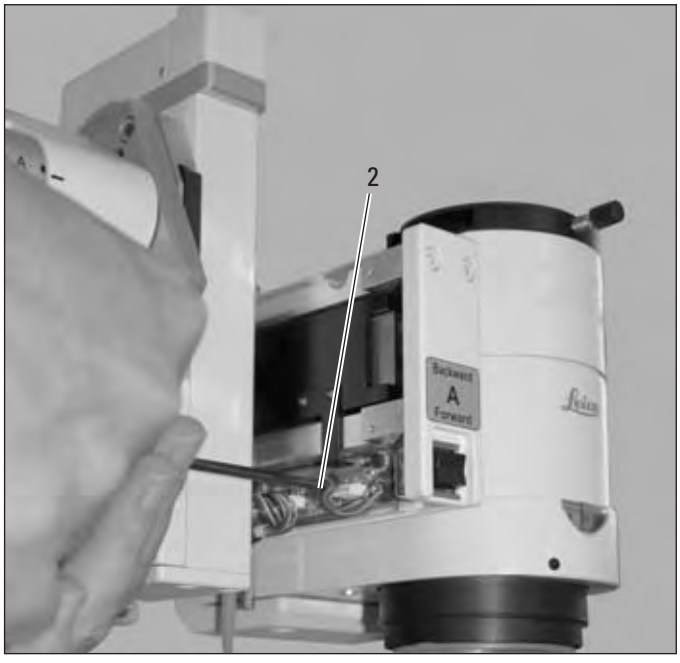

Fig. 2

Fig. 3

Connecting the optics carrier

⇨Connect the connector (4) below at the A sledge (Fig. 4).

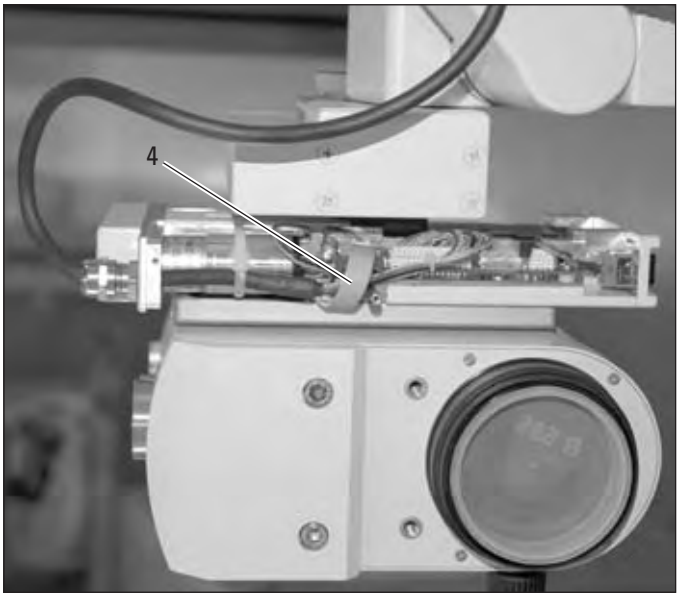

Fig. 4

Mounting handgrip

Only use the screws supplied to mount the right-hand handgrip. Longer screws can damage the optics carrier.

⇨Insert the shaft (1) of the right-hand handgrip into the optics carrier and secure it with four screws (2) (Fig. 1).

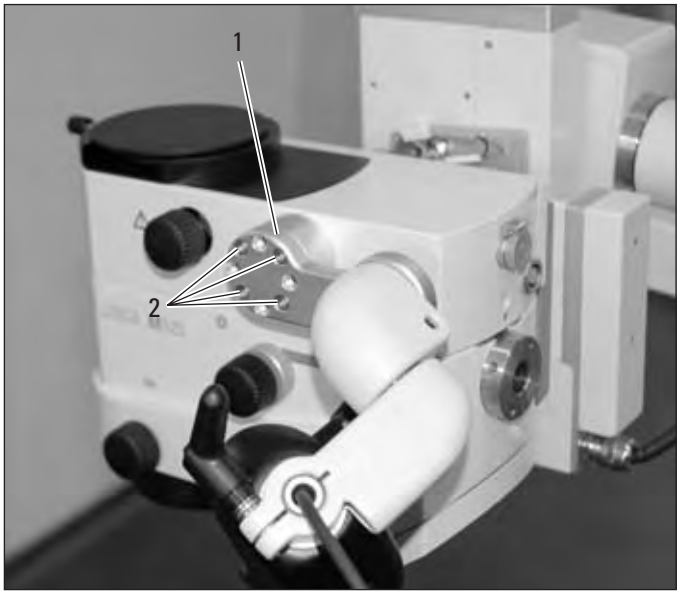

Fig. 1

The shaft can also be mounted displaced by 45° if necessary.

⇨Loosen the optics carrier slightly and screw the cover (3) back on (Fig. 2).

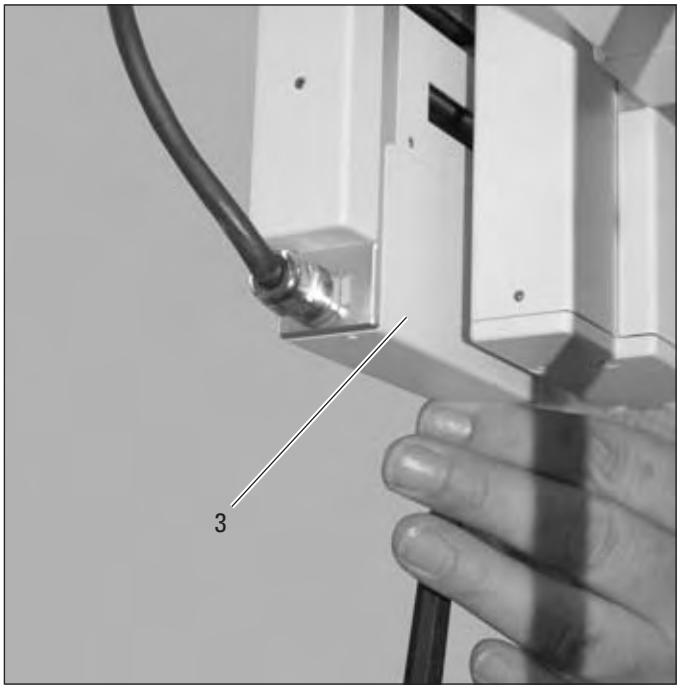

Fig. 2

⇨Tighten the 3 screws (1, 2 and 3, Page 15) to fasten the optics carrier.

Cabling the microscope carrier

⇨Screw off the cover (4).
⇨ Plug in the plug (5) of the handgrip cable (Fig. 3).

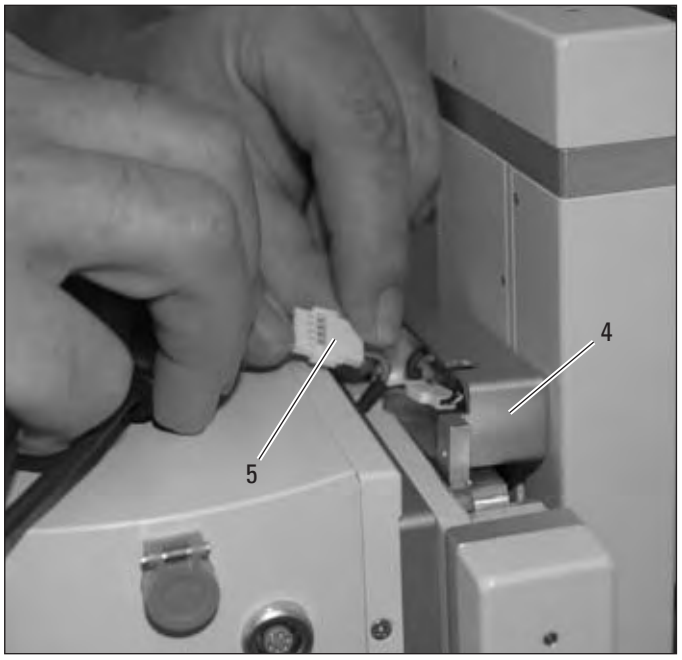

Fig. 3

⇨Fasten the cover (1) with 2 screws (Fig. 1).

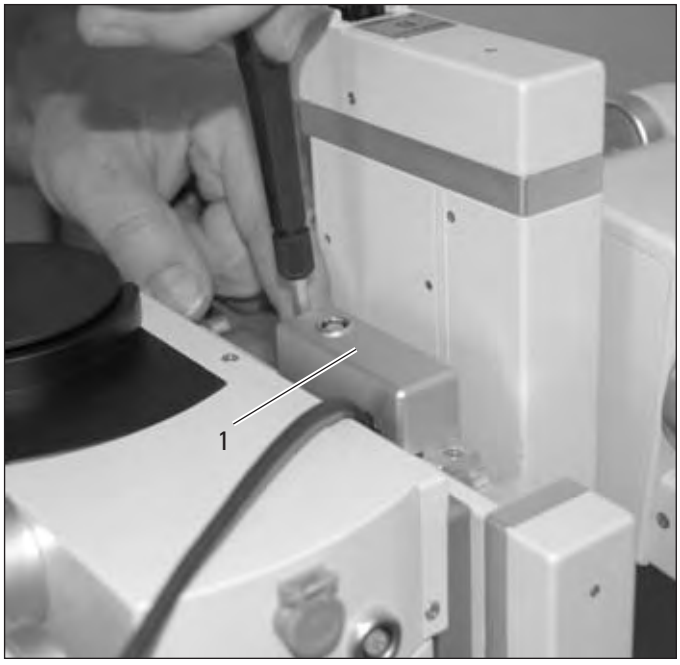

Fig. 1

⇨Mount the cover (2) (Fig. 2).

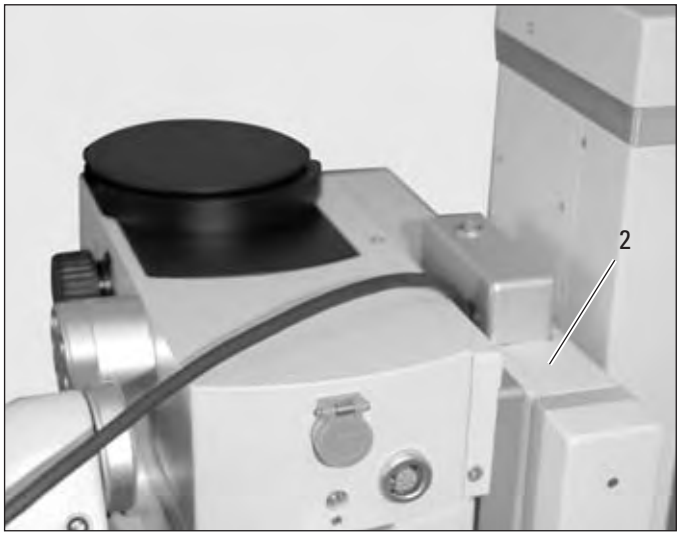

Fig. 2

⇨Insert the fiber-optics light guide (3) at the optics carrier (Fig. 3)

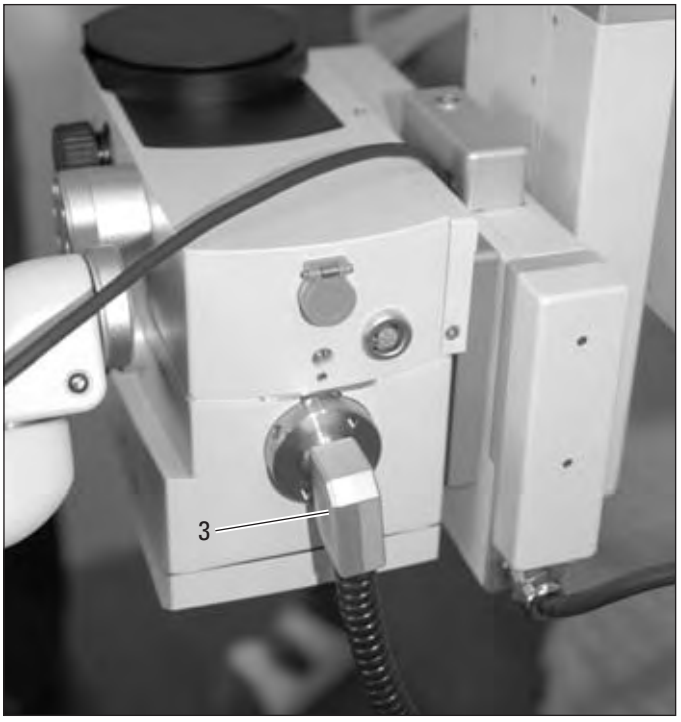

Fig. 3

Checking and setting the voltage

⇨Remove the packaging material from the stand base.
⇨Check in the window (1) above the power plug whether the country-specific voltage is set (Fig. 1)

Fig. 1

Modifying the set voltage

⇨Use the screwdriver to remove the cover (2) (Fig. 2).

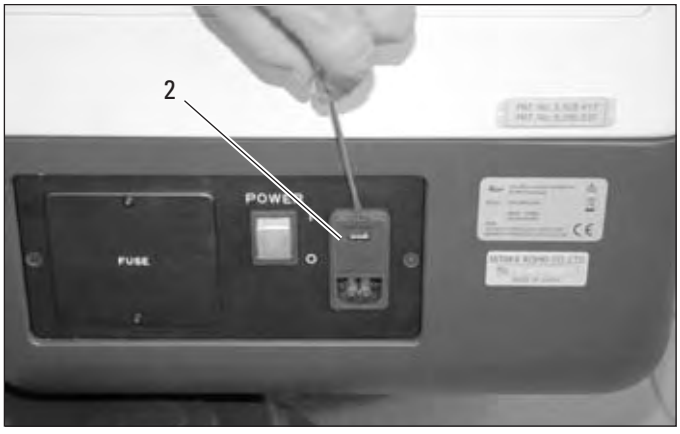

Fig. 2

⇨Remove the drum (3), turn to the correct voltage and insert it again (Fig. 3).

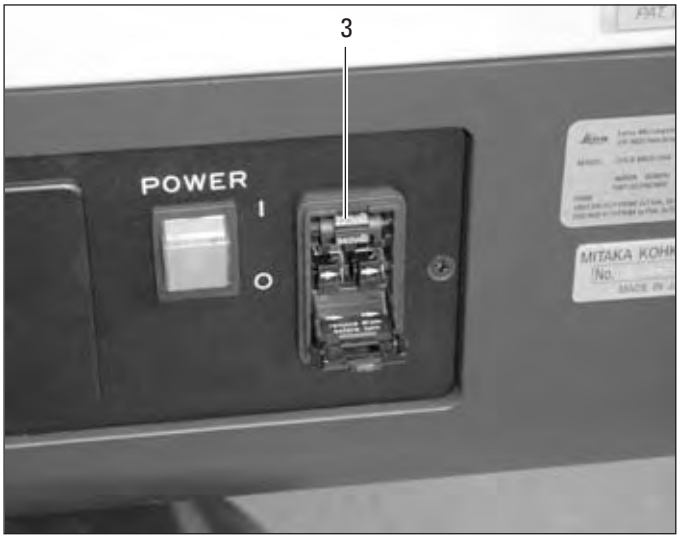

Fig. 3

⇨If necessary, replace the fuses.

Checking/Setting fuses

☞ If the voltage range is changed, be sure to check the fuses (1) and replace them, if necessary (Fig. 1).

Range 220 V–240 V: two 8 A fuses, time-delay
Range 100 V–120 V: two 10 A fuses, time-delay

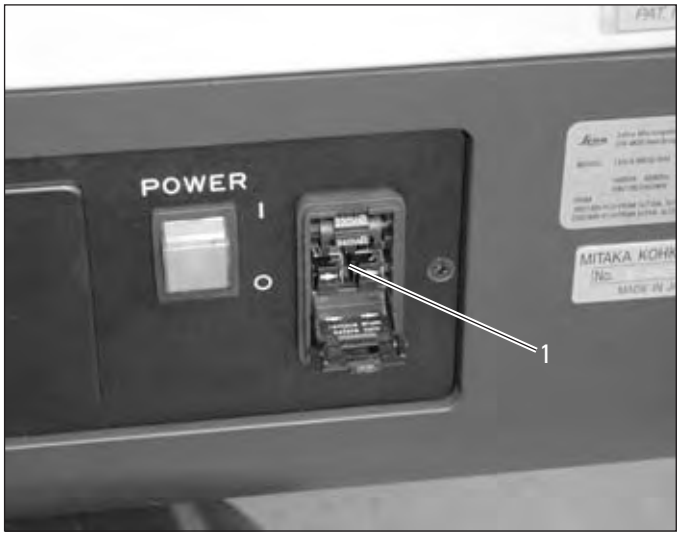

Fig. 1

⇨Remove the fuses (4) from the holders and check the type. Replace, if necessary (Fig. 4).

☞ The respective other fuse type is supplied together with the tools.

⇨Close the cover (2, Page 19) again.

Inserting the lamps

⇨Open the access hatch (3) for lamp inserts (Fig. 2).

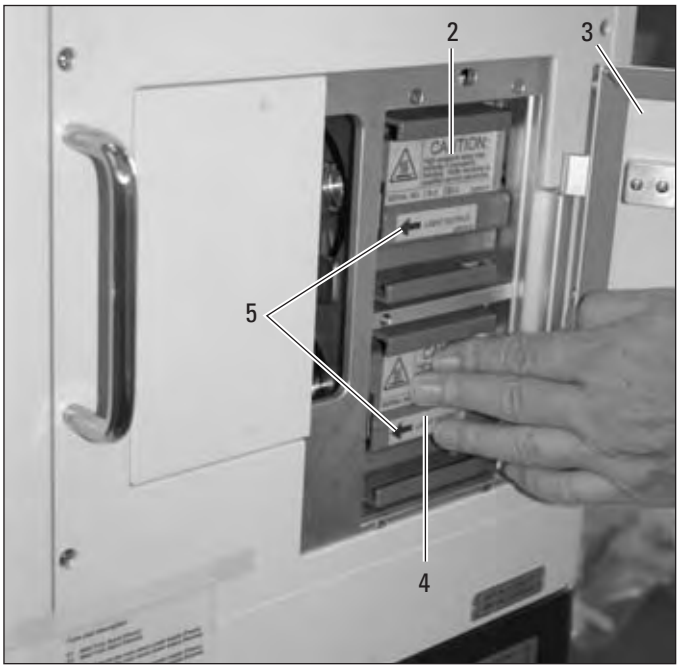

Fig. 2

⇨ Insert the lamp inserts (2) and (4).

☞ When inserting the lamp insert, ensure that the arrow (5) points to the left.

⇨Close the access hatch (3) again.

Installing and connecting the Leica MDRS(optional)

⇨Loosen the four Phillips screws (1) on the video drawer (2).

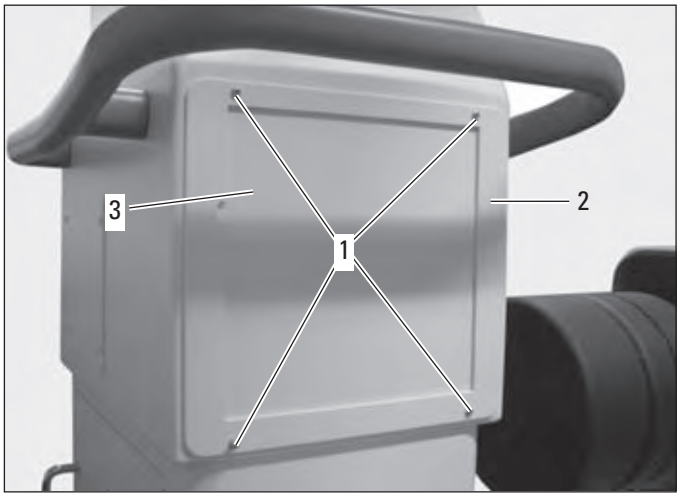

Fig. 1

⇨Pull video drawer (2) out and remove aperture (3).

Fig. 2

⇨Loosen the four Phillips screws (4) and remove the cover (5).

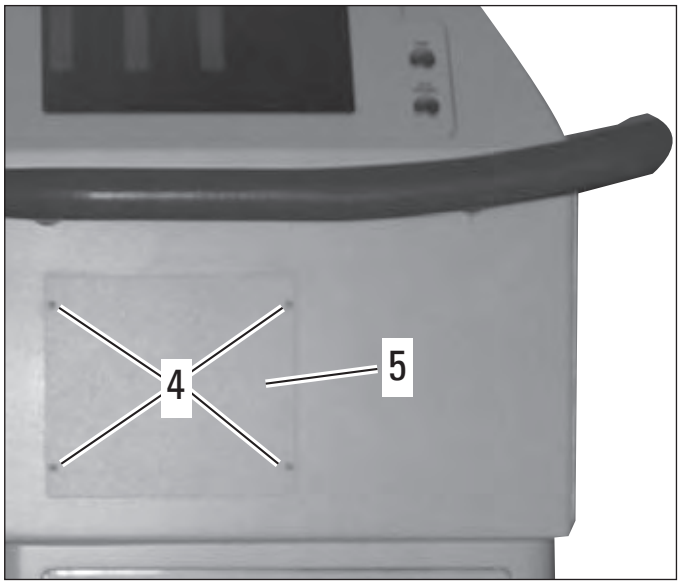

Fig. 3

⇨Loosen the two Allen screws (6) and remove the cover (7).

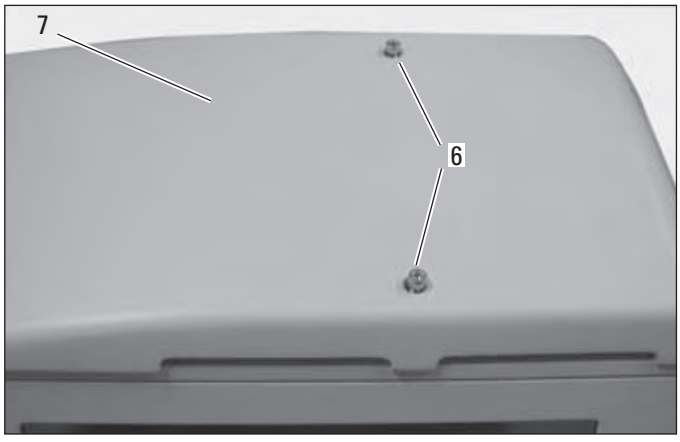

Fig. 4

⇨Loosen the two screws (8) and remove the plate with the fan (9).

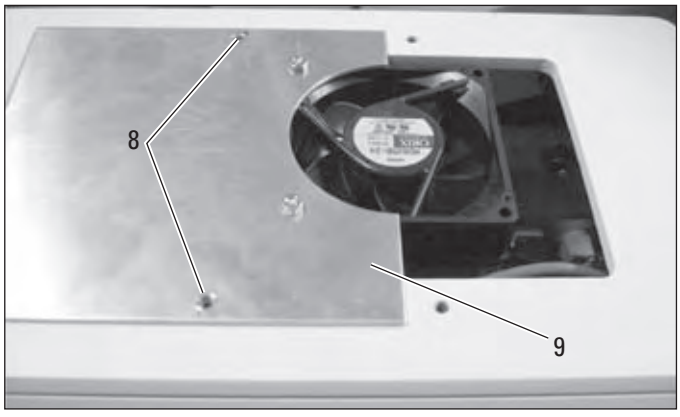

Fig. 5

⇨Remove all screws of both covers (10) with a 2.5mm Allen key and remove the covers.

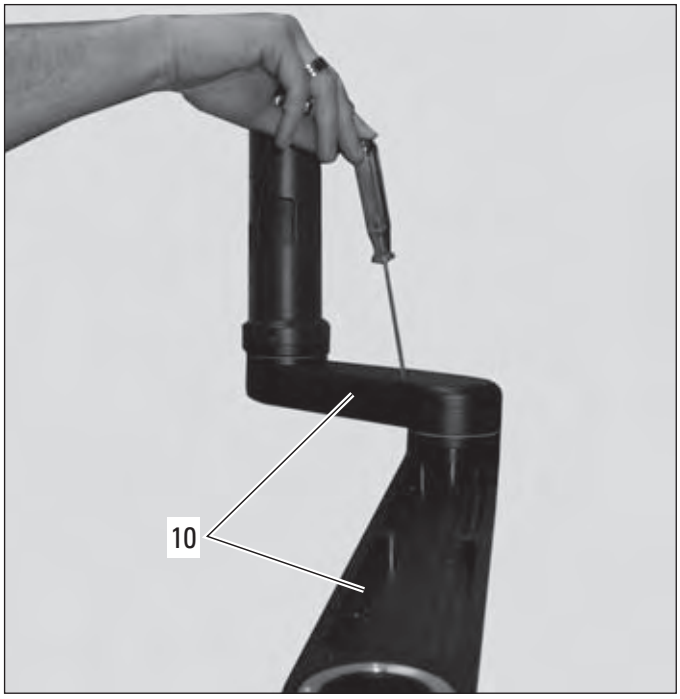

Fig. 6

⇨Mark the power supply cable (11) and DVI video cable (12) at a length of 250mm including the plug and insert them into the opening (13) of the articulated arm up to the mark.

⇨Mark the USB cable for the touch control (14) at a length of 280mm including the plug and insert it into the opening (13) of the articulated arm up to the mark.

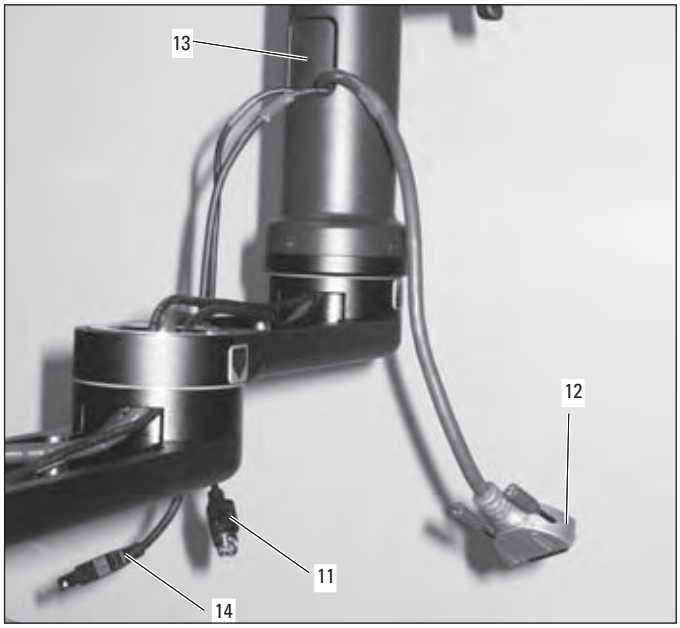

Fig. 7

⇨Insert all three cables into the opening (15) of the OH4 housing.

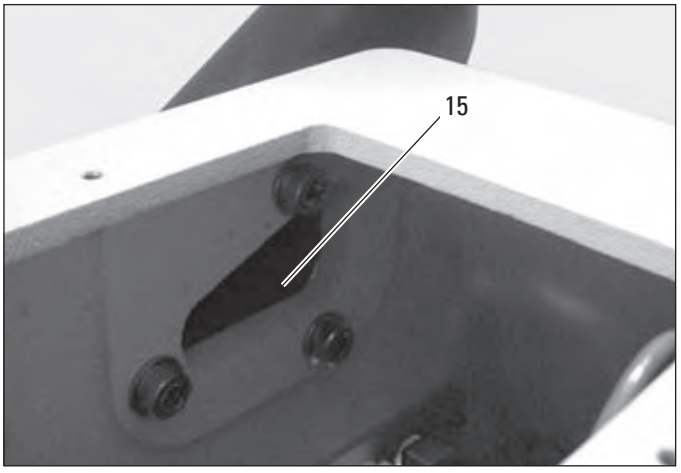

Fig. 8

⇨Carefully remove the cover (16) held by three pins on the rear of the monitor.

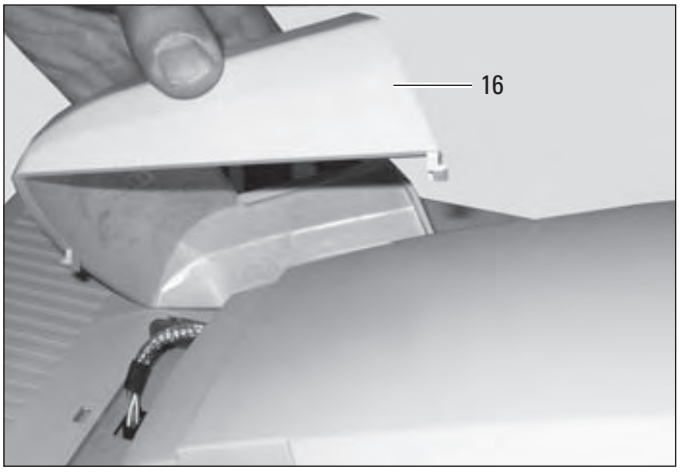

Fig. 9

⇨Loosen the four Phillips screws (17) and remove the monitor base (18).

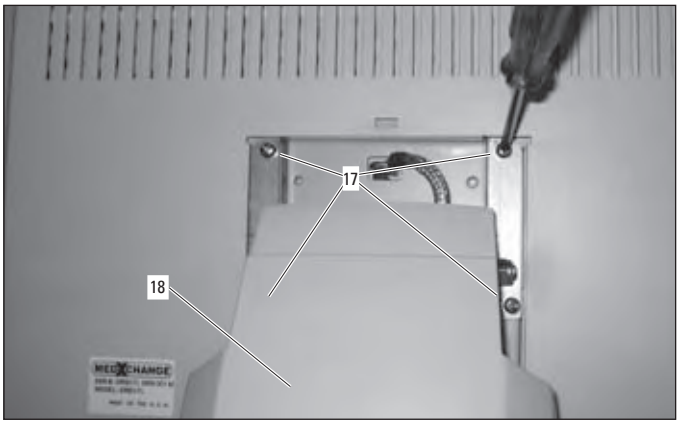

Fig.10

⇨Attach monitor to the VESA 100 mount (20) of the articulated arm with four M4x10 Allen screws (19).

⇨Connect the DVI monitor cable (12), USB touch control cable (14) and power supply cable (11) to the monitor as shown.

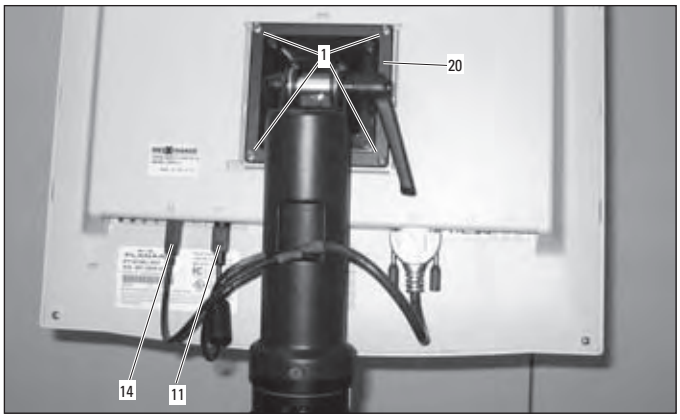

Fig. 11

⇨Remove the two screws (21) of the cover (22) on the control unit (23).

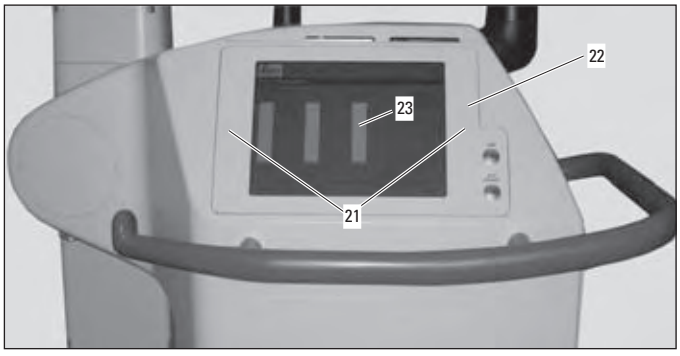

Fig. 12

⇨Remove the two screws retaining the control unit (23) and carefully lift it out of the housing.

⇨Disconnect the 19 V (24) and 12 V (25) terminals.

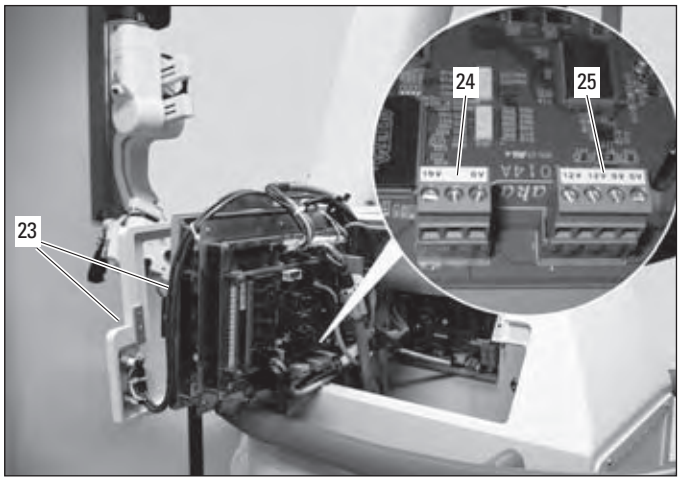

Fig. 13

⇨Connect the power supply cable (26) of the MDRS4 system unit to the 19 V terminal (24). Loosen the screws, insert the lead wires (red to 19 V, black to 0 V) and tighten the screws to clamp them.

⇨If you do not intend to use the included power supply for the monitor of the MDRS, connect the power supply cable (11) for the monitor that you have routed into the housing of the OH4 (Fig. 8) to the 12 V terminal (25).

⇨Loosen the screws, insert the lead wires (red/yellow to 12 V, black/white to 0 V) and tighten the screws to clamp them.

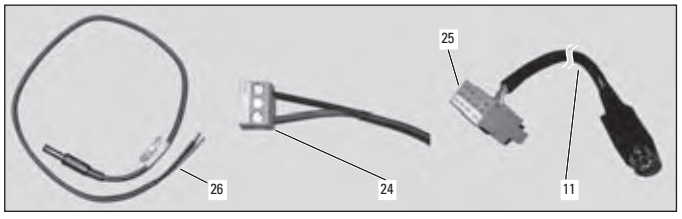

Fig. 14

⇨Reconnect both terminals to the OH4 Master Control

Board (27).

Fig. 15

⇨Insert the Leica MDRS system unit (28) into the video drawer (2) from the front.

⇨Connect the DVI monitor cable (12), USB touch control cable (14) and power supply cable (11) to the system unit (28) as shown.

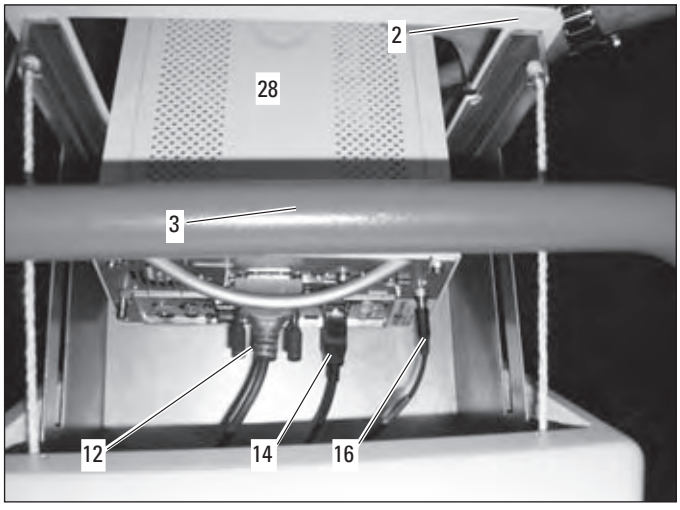

Fig. 16

⇨Place the complete system unit into the video drawer and secure it in place with straps.

☞ Ensure that the cables are not trapped.

Fig.17

⇨Secure the video drawer with the four Phillips screws (1).

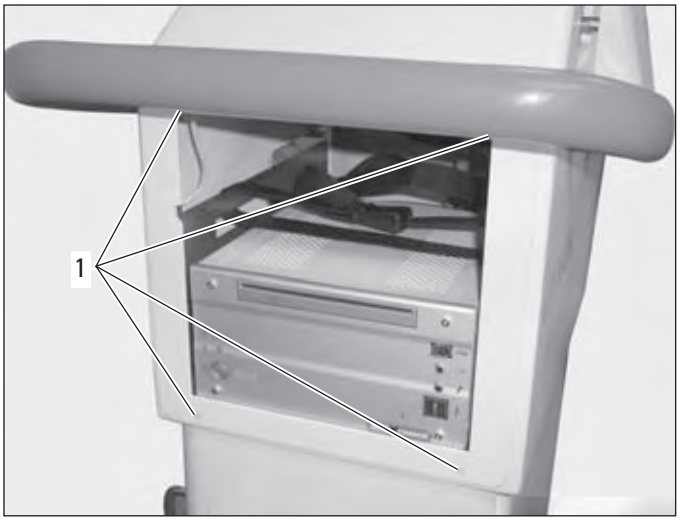

Fig. 18

☞ Do not replace the remaining covers of the OH4 until you have completed the installation of all components.

Installing and connecting the fluorescence components (optional)

Installing fluorescence filters (Leica FL400 and Leica FL800)

⇨Loosen the two Phillips screws (1) and remove the cover (2).

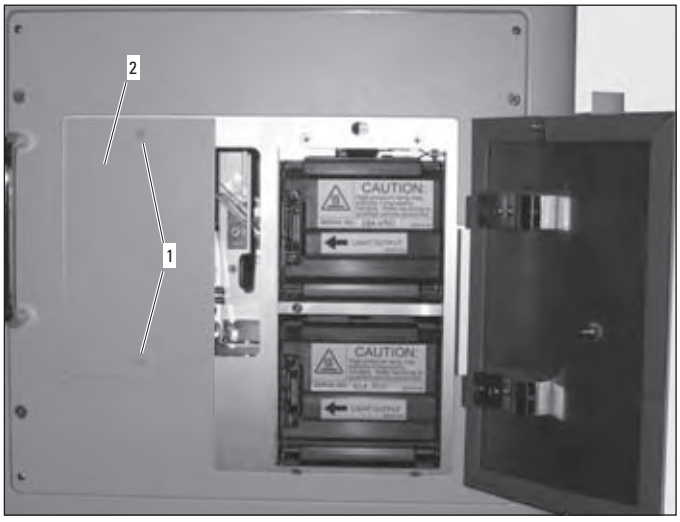

Fig. 1

⇨Use a 2.5 mm Allen key to loosen the grub screw (3) retaining the filter wheel (4).

⇨Slide the filter wheel (4) from its axis.

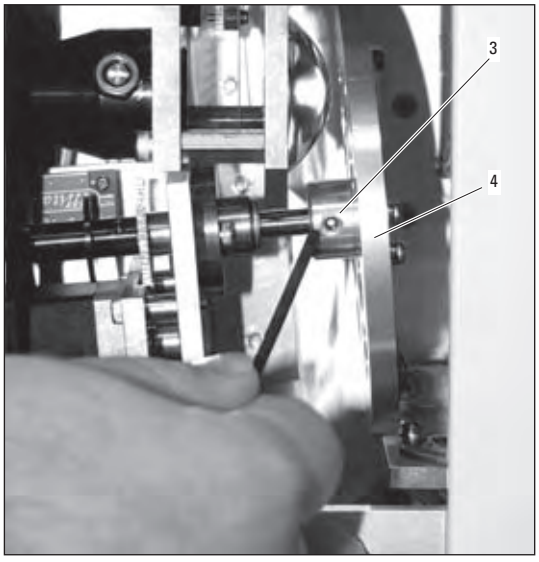

Fig. 2

Overview of filter positions (front view)

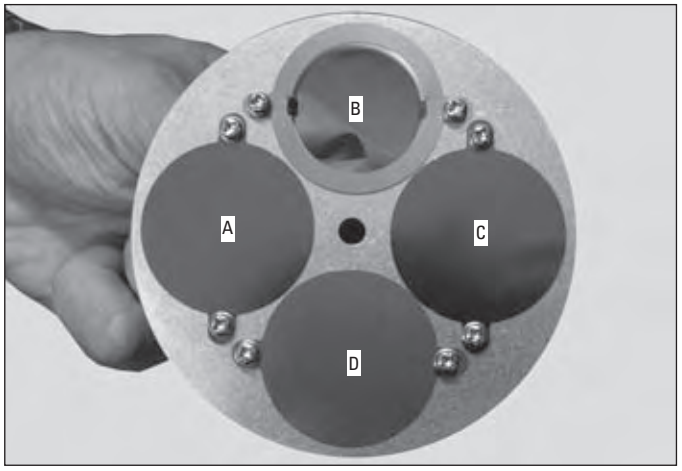

Fig. 3

A empty
B standard filter (31.3 mm)
C FL400 filter set (2 ea.) (27.0 mm)
D FL800 filter (32.0 mm)

⇨Loosen the two Phillips screws and remove the filter holder and aperture.

⇨Insert the appropriate filters and secure them by replacing the filter holder and two Phillips screws.

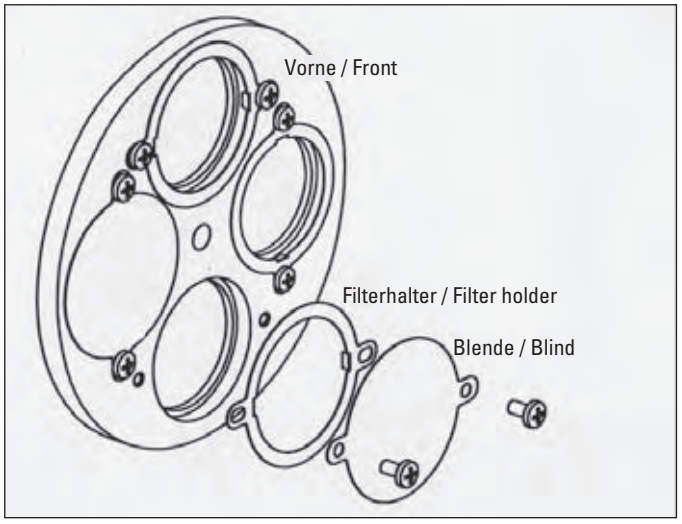

Fig. 4

⇨Slide the filter wheel (4) and filters back onto the axis.

☞ Ensure that the orientation pin (5) engages the groove.

⇨Retighten the grub screw (3) to retain the filter wheel (4).

⇨Reclose the cover (2).

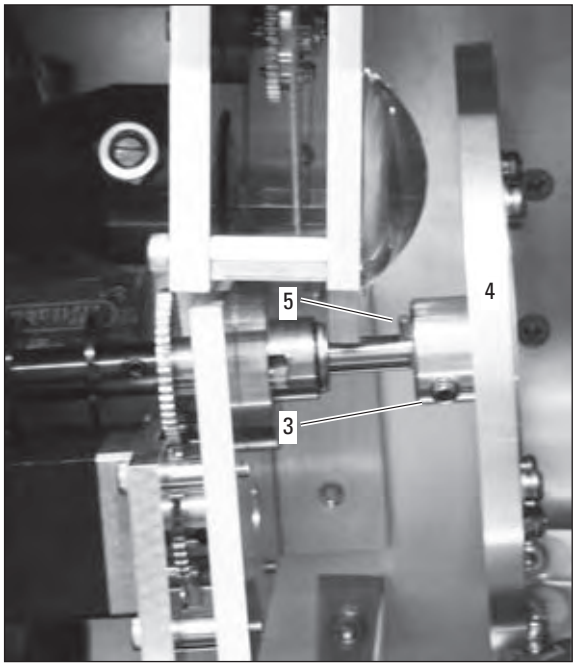

Fig. 5

Installing the Fluorescence Connector Board (Leica FL400 and Leica FL800)

⇨Remove the two screws (6) of the cover (7) on the control unit (8).

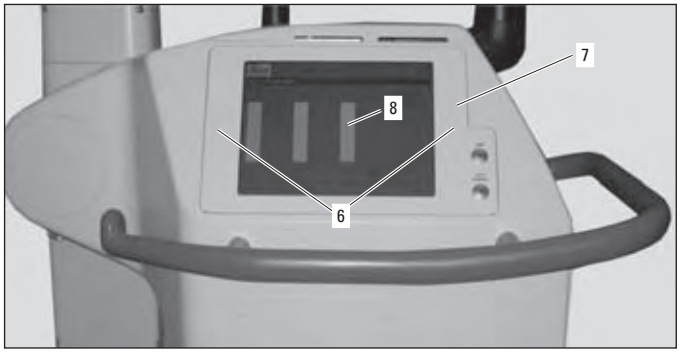

Fig. 6

⇨Remove the two screws retaining the control unit (9) and carefully lift it out of the housing.

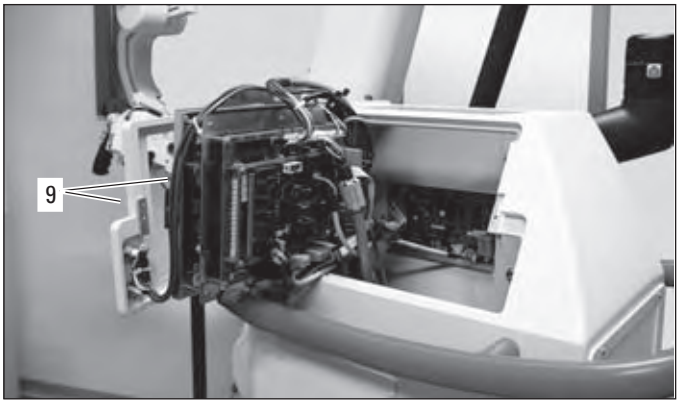

Fig. 7

⇨Connect the cable of the Fluorescence Connector Board (10) to the OH4 Connector Board (11) as shown.

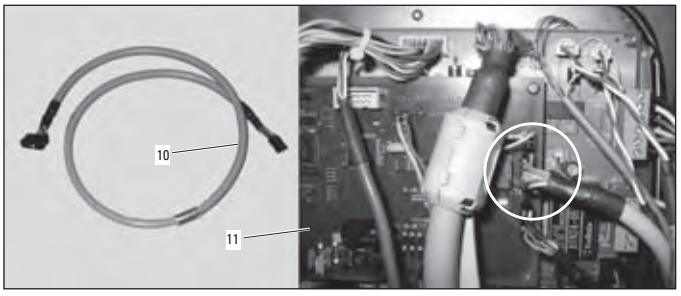

Fig. 8

⇨Open the side door and unscrew the two Allen screws (12) in order to remove the VGA Switchboard (13).

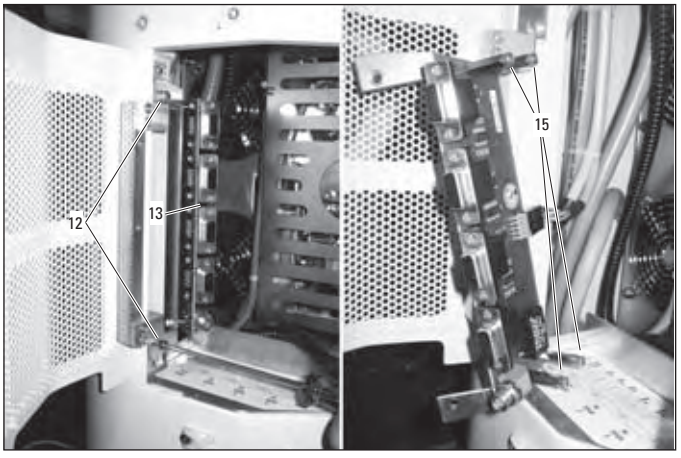

Fig. 9

⇨Use the available screws to mount the Fluorescence Connector Board (14) onto the four bridges (15).

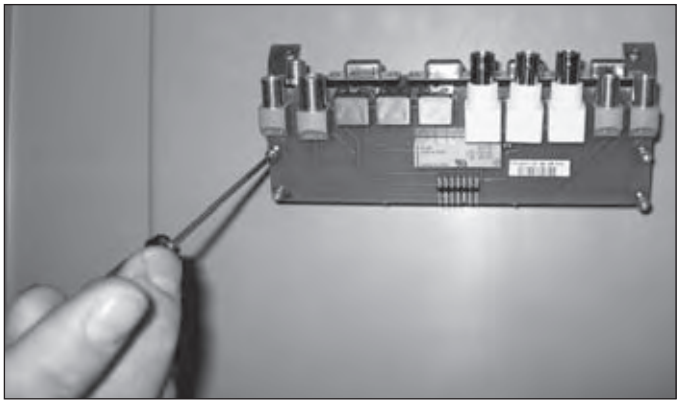

Fig. 10

⇨Connect the cable of the Fluorescence Connector Board (10) to the OH4 Connector Board (14).

⇨Reattach the boards with the two Allen screws (12).

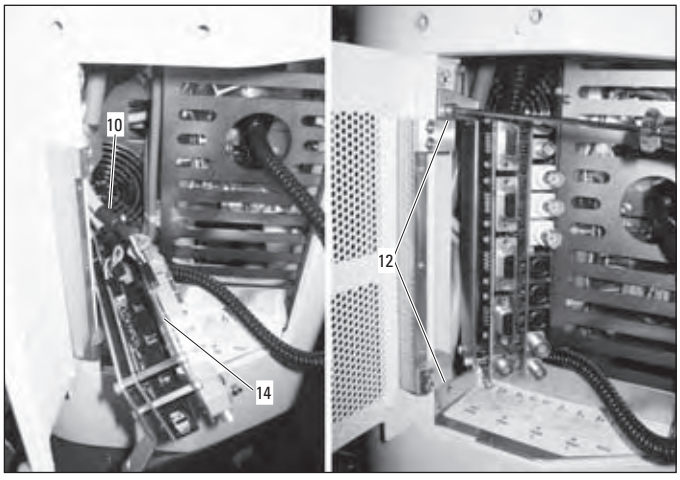

Fig. 11

Installing and connecting the additional light source (Leica FL400 only)

⇨Attach the holder for the additional light source to the stand with the two included M6x16 Allen screws (16).

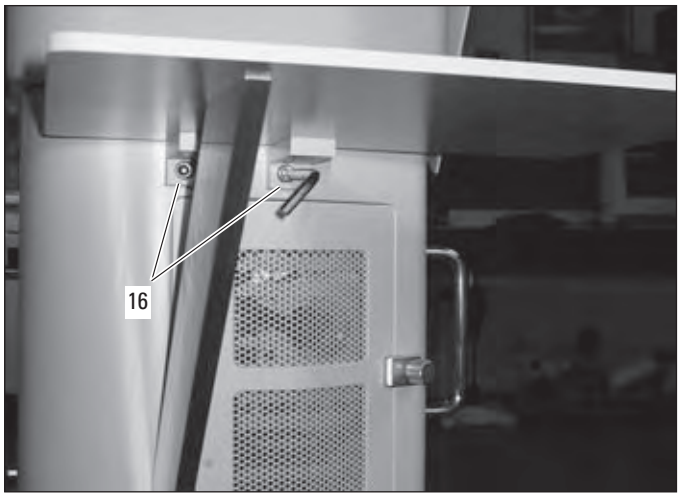

Fig. 12

⇨Loosen the two Phillips screws (17) and open the cover (18).

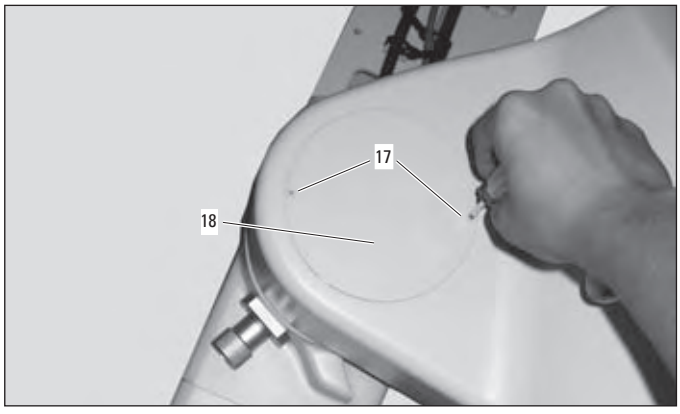

Fig. 13

⇨Insert the fluid light guide (19) through the new cover with opening as shown.

☞ Leave the protective cap (20) on the fluid light guide to protect the optics.

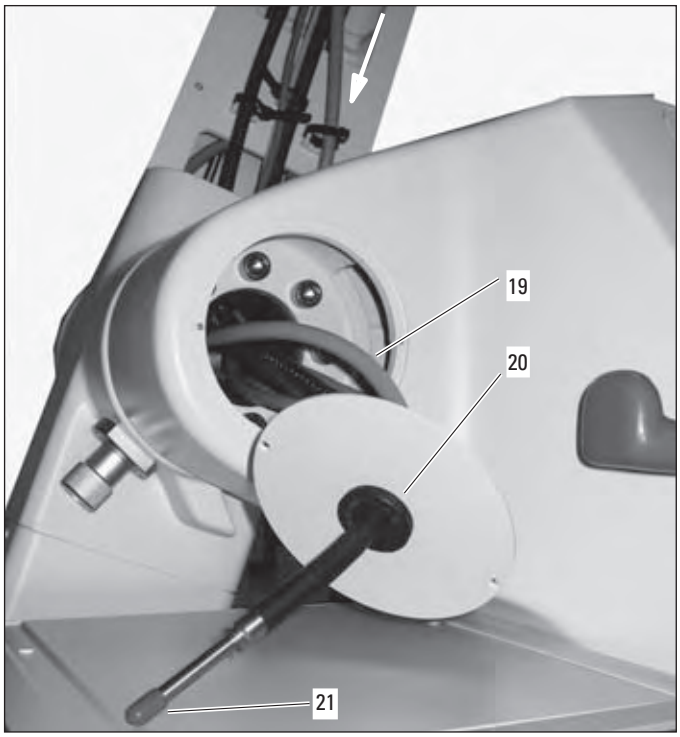

Fig. 14

☞ A cable tie (distance to tip of light guide 630 mm) may be applied to the light guide as a strain relief. (Fig. 15)

Fig. 15

⇨Secure the new cover (20) with the two Phillips screws.

⇨Insert the other end of the fluid light guide through the vertical arm, swing arm and microscope carrier.

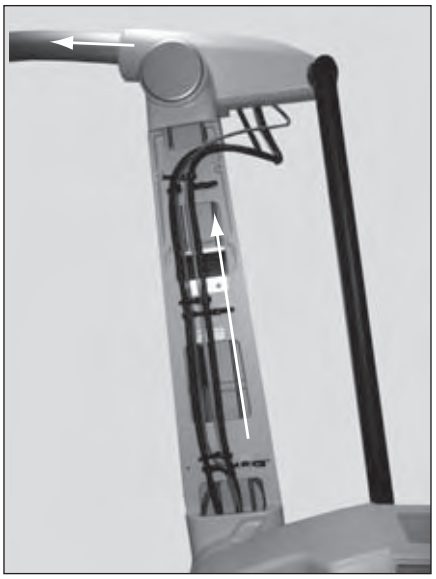

Fig. 16

⇨Attach the fluid light guide holder (22) to the B-sledge with adhesive tape as shown.

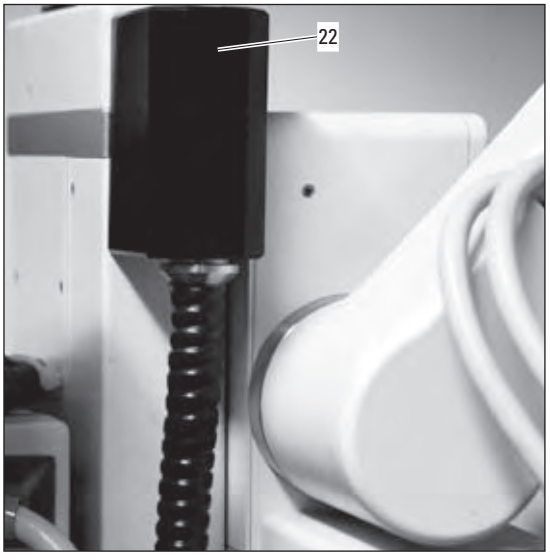

Fig. 17

⇨Connect the footswitch connector on the front of the additional light source to the "Storz Light Source" connector on the Fluorescence Connector Board with the control cable (23).

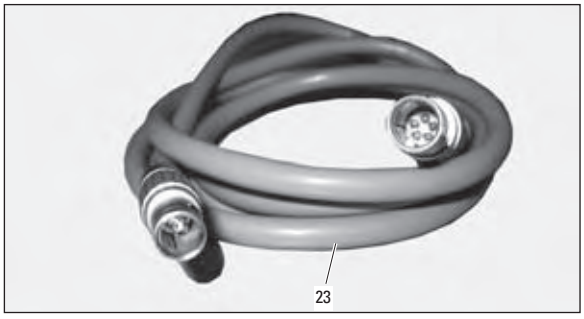

Fig. 18

Installing Leica MDRS for fluorescence

Insert the MDRS fluorescence software CD (10 448 256) and install the MDRS fluorescence software (see included installation manual).

The following additional cable connections must be realized in order to use the MDRS:

⇨Connect "Scope" (25) on the rear of the MDRS system unit and "MDRS" on the VGA Switchboard (13) using the control cable (24).

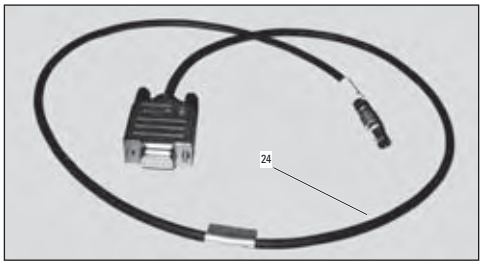

Fig. 19

⇨When using a Leica DI C500 to display the NIR video sequences of the Leica MDRS, connect the XGA video able to the Leica DI C500 at the VGA port (26) of the Leica MDRS system unit.

Fig. 20

Connecting video cables

⇨When using the Leica OH4 with at least one of the following components:
Leica MDRS with MDRS fluorescence software
Leica FL800 camera
Leica FL800 camera
make the video connections as follows:

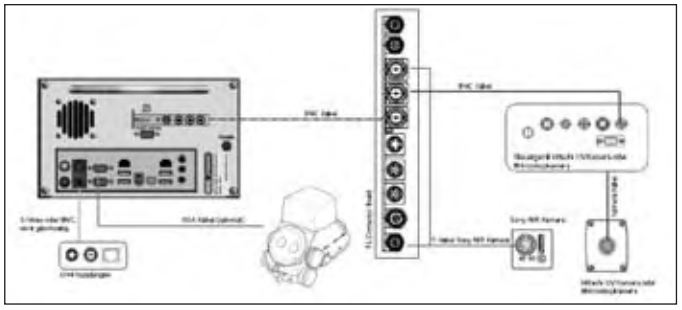

Fig. 21

Installing and connecting the camera control unit (optional)

The camera control unit of an optional microscope camera or the optional Leica FL400 UV camera may be placed in the video drawer of the Leica OH4.

Insert the camera cable in the control unit outside and guide it through the stand to the optics carrier.

Fig. 22

Connecting OH4 couplings (optional)

⇨The video couplings may be used to transfer video signals from a camera control unit or the Leica MDRS system unit to external devices such as existing surgical monitors.

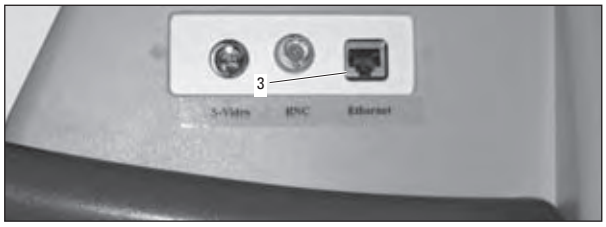

Fig. 23

Disassembly

The Leica M525 OH4 is disassembled in the reverse sequence of operations to assembly.

When disassembling the optics carrier observe the following points:

☞ The Leica M525 OH4 must still be operating!

⇨Move the A sledge to the center position.
The screws are now accessible (Fig. 1).

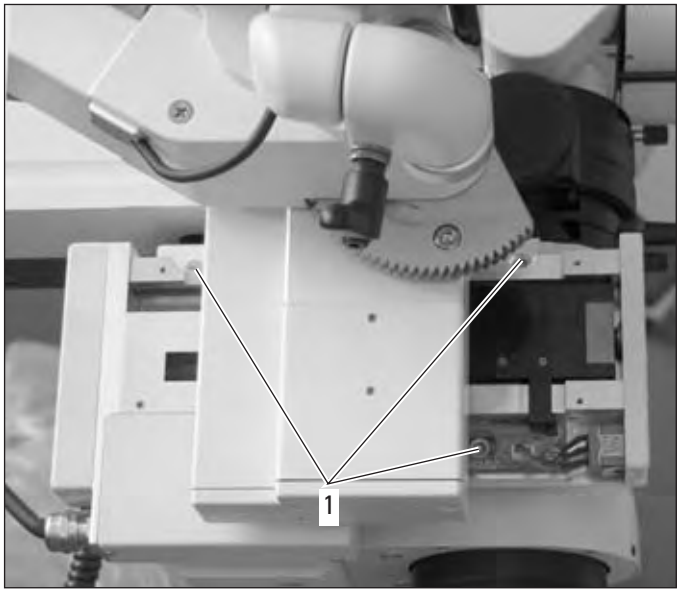

Fig. 1

Checklist

❒Are all the covers screwed on firmly?

❒Are all cables laid neatly?

❒Are all screws tightened with the specified torque?

❒Do any components contact one another when the Leica M525 OH4 is moved?

Balancing out the Leica M525 OH4

Warning
Risk of injury by movements of the microscope during balancing out!
⇨Ensure that no one is in the direct vicinity of the microscope while balancing it out.

⇨Switch on the Leica M525 OH4.
⇨Refer to the Leica M525 OH4 user manual for the further actions.

Checking mobility

⇨Move the Leica M525 OH4 to the stretched position.
⇨Move each movable shaft until it stops.
Ensure that cables have freedom of movement and are not tensioned.
If necessary:
⇨Loosen cables, increase size of cable loop and resecure with cable ties.

Carrying out functional tests

Additional information on the tests listed here can be found in the Leica M525 OH4 user manual.

⇨Press ALL FREE button (5) on handgrip.
All brakes must be released.

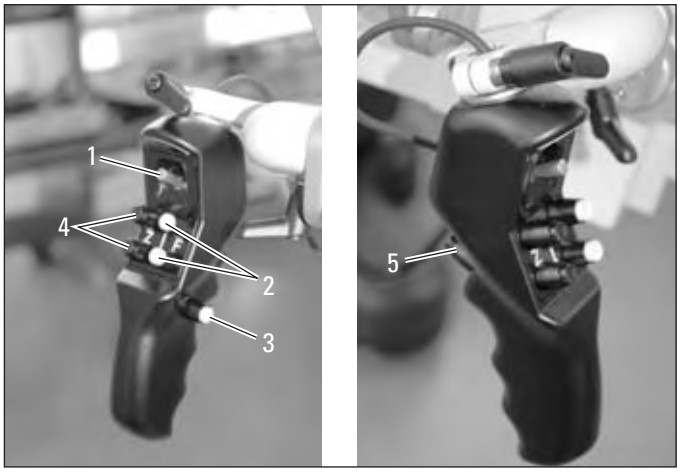

Fig. 1

⇨Press selector button (3) on handgrip.
The three brakes of the set brake grouping must be released.
⇨Press the buttons for zoom (4) and focus (2).
⇨Check whether zoom and focus mechanisms at the optics carrier move properly.
⇨Move stand to its intended working position.
⇨Check each position of microscope to determine whether it remains in its position when the brakes are released. There must be no perceptible upward, rearward or frontward tension.
All movement must be silent and smooth.

Always allow the main and backup illuminators to remain lit for at least 5 minutes, otherwise the lighting capacity will be quickly reduced.

⇨Switch on the main illuminator and check its function.
⇨Use the lever (6) to switch to the backup illuminator and check whether it functions (Fig. 2).

Fig. 2

⇨Operate the joystick (1) at the handgrip.
The microscope carries out the corresponding XY movements.

Inspection and acceptance sequence

Once assembly or maintenance work is finished, Leica Service will start the inspection and acceptance sequence.

☞ The system as a whole should not be started up until acceptance by Leica Service has taken place.

This inspection is aimed at determining whether
- the safety requirements concerning the protection of the patients and of the medical personnel have been fulfilled,
- the performance characteristics of the M525 OH4 surgical microscope system are being fulfilled.

This is followed by the training of the personnel.

Delivery report of the Leica M525 OH4 surgical microscope

Assembly and functional testing of the Leica M525 OH4 surgical microscope were carried out properly in accordance with the regulations contained in the assembly instructions.

Name and address of the customer

Representative of Leica Microsystems (Schweiz) AG

Name

Address

Acknowledged Signature

Location Date

This delivery report is to be filled out by the responsible Leica representative.

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CE

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